State of California
The Resources Agency
Department of Water Resources
Northern District

Pesticide Monitoring of Surface Waters in the Northern District

Memorandum Report

by

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April 1990

Introduction

Pesticides are used throughout Northern California, but most extensively in the Sacramento Valley, for weed and insect control in agriculture and forestry, and also for domestic use, public health concerns, and industry. Pesticides are often applied near surface waters, and, inevitably, some of the pesticide residue enters surface waters during or soon following application through spray drift, rain runoff, agricultural return flow, or infiltration. The main concern about pesticides in surface waters is their potential to be toxic to both people and aquatic life.

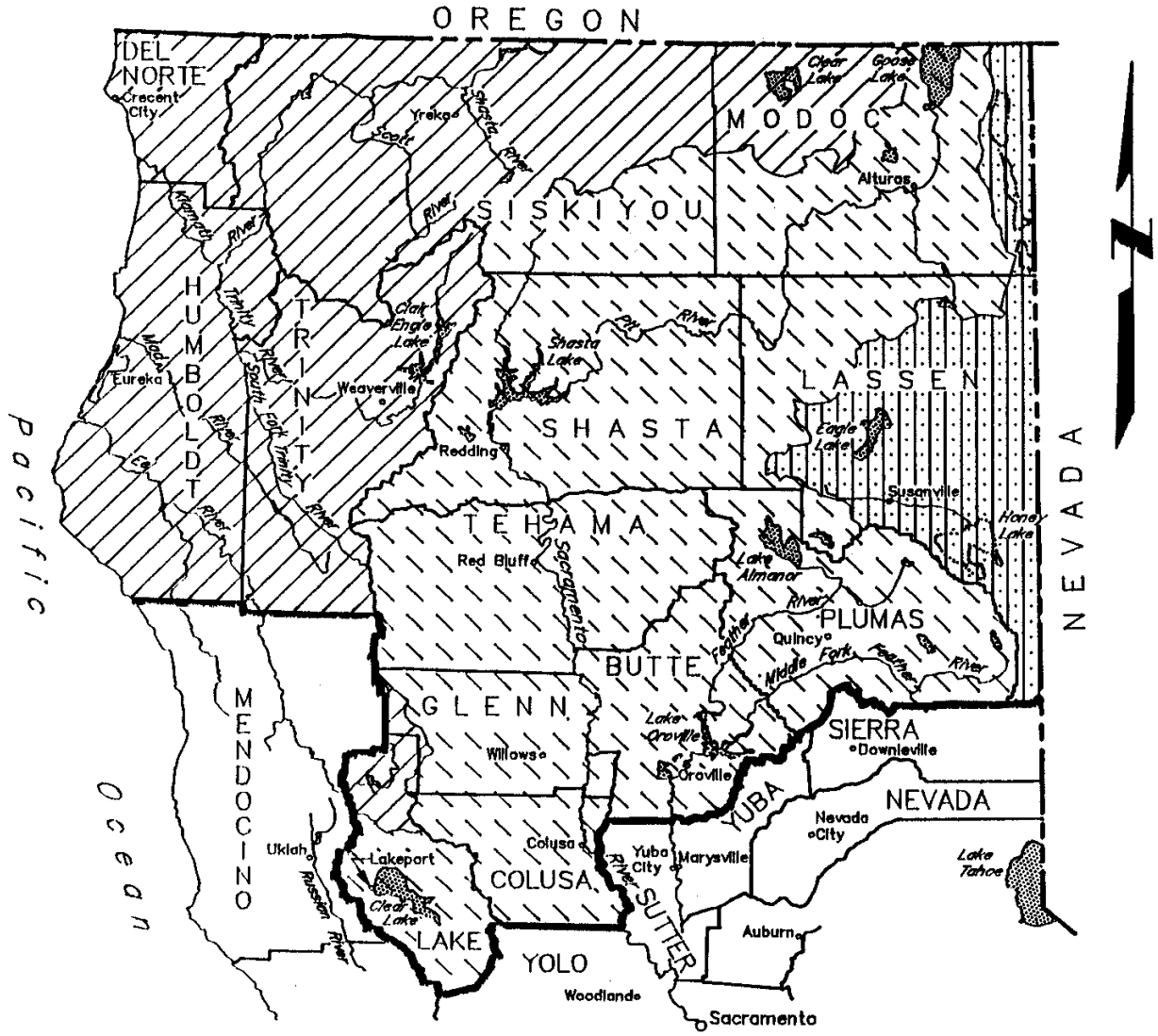
The purpose of this investigation was to determine the extent of pesticide monitoring of surface waters in Northern California, and to determine additional monitoring requirements. The study area includes the 13 counties within the Northern District (Figure 1) and those monitoring stations within Sutter and Yolo counties that are located on the Sacramento River and on its major drainages.

The following agencies were contacted for information:

Department of Food and Agriculture (DFA)
Department of Fish and Game (DFG)
State Water Resources Control Board (SWRCB)
Central Valley Regional Water Quality Control Board (CVRWQCB)
North Coast Regional Water Quality Control Board (NCRWQCB)
Department of Health Services (DHS)
Shasta County Agriculture Department
Tehama County Agriculture Department
Tehama County Farm Advisor's Office
Glenn County Agriculture Department
Butte County Agriculture Department
Colusa County Agriculture Department

Past Studies

In 1964, a report was written on pesticide use that explored the then existing programs, discussed specific deficiencies, and proposed steps to be taken to remedy the deficiencies (Fisher, 1964). The major problem of pesticides in water was determined to be the capability of the aquatic food chain to concentrate persistent pesticides. Monitoring the water



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- North Coast Region
- Central Valley Region
- Lahontan Region

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Figure 1. Northern District Counties

environment was realized to be very important in any program of total surveillance for the presence and effects of pesticides. The questions asked then on pesticide levels in the environment and their effects are important and are still being asked today.

The State Water Resources Control Board (SWRCB), in cooperation with an "ad hoc" group of members from state agencies and academic institutions, prepared a report in 1971 which reviewed and summarized historic and current pesticide monitoring within California (SWRCB, 1971). The majority of programs in existence then were found to be of limited duration and for a specific purpose only. The little coordination of programs resulted in duplicated effort, and, more seriously, left significant pesticide emissions unmonitored. Within the Northern District, surface water from Clear Lake had been monitored for DDT and methyl parathion as part of a biological study lead by the U. S. Fish and Wildlife Service. The Department of Water Resources (DWR) monitored inflowing streams to Clear Lake for DDT, BHC, dieldrin, and lindane. Sediment samples from Clear Lake and Upper Blue Lake were analyzed for DDT, BHC, lindane, kelthane, heptachlor epoxide, dieldrin, endrin, and aldrin under a joint agency program. The Department of Fish and Game (DFG) had analyzed fish for DDT, dieldrin, and aldrin at Clear Lake, Colusa Basin Drain, and Red Bluff (SWRCB, 1971).

Current Monitoring Programs

The Department of Food and Agriculture (DFA) is the lead agency for the regulation of pesticides. DFA is currently working with the DFG and the Central Valley Regional Water Quality Control Board (CVRWQCB) on a study of rice pesticides in the Sacramento Valley from Glenn County to south of Sacramento. This rice pesticide program is the main program in the Sacramento Valley which monitors surface waters for pesticides on a routine basis. Timber pesticide use in the North Coast and Central Valley regions (Figure 1) has been studied by the North Coast Regional Water Quality Control Board (NCRWQCB), the CVRWQCB, and the SWRCB. The SWRCB also monitors surface waters throughout California for its Toxic Substances Monitoring Program. The SWRCB has occasionally monitored pesticides within the Northern District monitoring area at 33 stations since the start of the program. The Department of Health Services (DHS) samples various public drinking water surface sources for pesticides throughout the state. No positive results were reported in the Northern District counties. Some recent limited duration surface water monitoring has been done due to the strawberry fumigation in Shasta and Tehama counties (CVRWQCB, 1984), the wild rice drainage in the Fall River drainage area (CVRWQCB, 1985), and agricultural drainage to Modoc National Wildlife Refuge and Ash Creek Wildlife Management Area (CVRWQCB, 1988). Pesticides were unmeasurable or insignificant in these three studies. The only other time monitoring is done is when there is a complaint or a fish or wildlife kill.

Rice Pesticide Program

The cooperative rice pesticide program between the DFA, DFG, and CVRWQCB was developed in an effort to reduce the discharges of rice pesticides into State surface waters. Since 1983, surface waters have been monitored at 9 permanent sites. Of these, only the Colusa Basin Drain at Highway 20 (CBD5) is within the Northern District, and four are within the monitoring area (Figure 2). Monitoring takes place during the rice field discharge period of late April through June. Besides surface water, aquatic organisms are also sampled. A special study was also conducted in 1988 to better understand rice pesticide movement in the Colusa Basin Drain. Nine additional sites were monitored for this study, all of which are within the Northern District. The City of Sacramento monitors the Sacramento River for pesticides at its water treatment plant.

Molinate and thiobencarb are the two major rice pesticides used. A few of the other rice pesticides for which sampling has been conducted are bentazon, carbofuran, carbaryl, and propanil. Both molinate and thiobencarb have been found in agricultural drains and in the Sacramento River at concentrations detrimental to beneficial uses. Molinate in agricultural drains was responsible for the deaths of tens of thousands of fish in the early 1980's (Appendix 1). Bad taste in the drinking water of the City of Sacramento has been attributed to the presence of thiobencarb in the Sacramento River. The highest concentrations of molinate and thiobencarb in the environment (over 2,000 parts per billion (ppb)) were detected in the edible portions of fish during the rice pesticide season (SWRCB, 1984a).

In 1984, DHS and DFG developed guidelines and action levels for molinate and thiobencarb. For the protection of the aquatic environment, molinate was not to exceed 90 ppb and thiobencarb was not to exceed 24 ppb. Primary action levels for the protection of water consumers from adverse health effects was set to 20 ppb for molinate and 10 ppb for thiobencarb. A secondary action level of 1 ppb for thiobencarb was recommended because of the bad taste it could cause in chlorinated drinking water. These action levels were derived using the United States Environmental Protection Agency's (EPA) method which assumes that a 10-kg child consumes one liter of water daily. Based on toxicologic evaluations, molinate is considered to be moderately toxic when taken orally and practically non-toxic when it is applied to the skin. Thiobencarb is slightly toxic when taken orally (SWRCB, 1984a).

Research on molinate showed that longer water retention periods on rice fields would facilitate dissipation. Molinate was placed on the restricted list in 1984 and releases to State waterways were not allowed for 8 days following application. Retention time was increased to 12 days in 1987 and to 14 days in 1988. No fish kills have been attributed to molinate since 1983 and concentrations in the Sacramento River have been well below the primary action level.

Recirculation and ponding of field water was found to facilitate adsorption after studies of thiobencarb's characteristics were made in 1984 (SWRCB, 1984a). Thiobencarb's use has

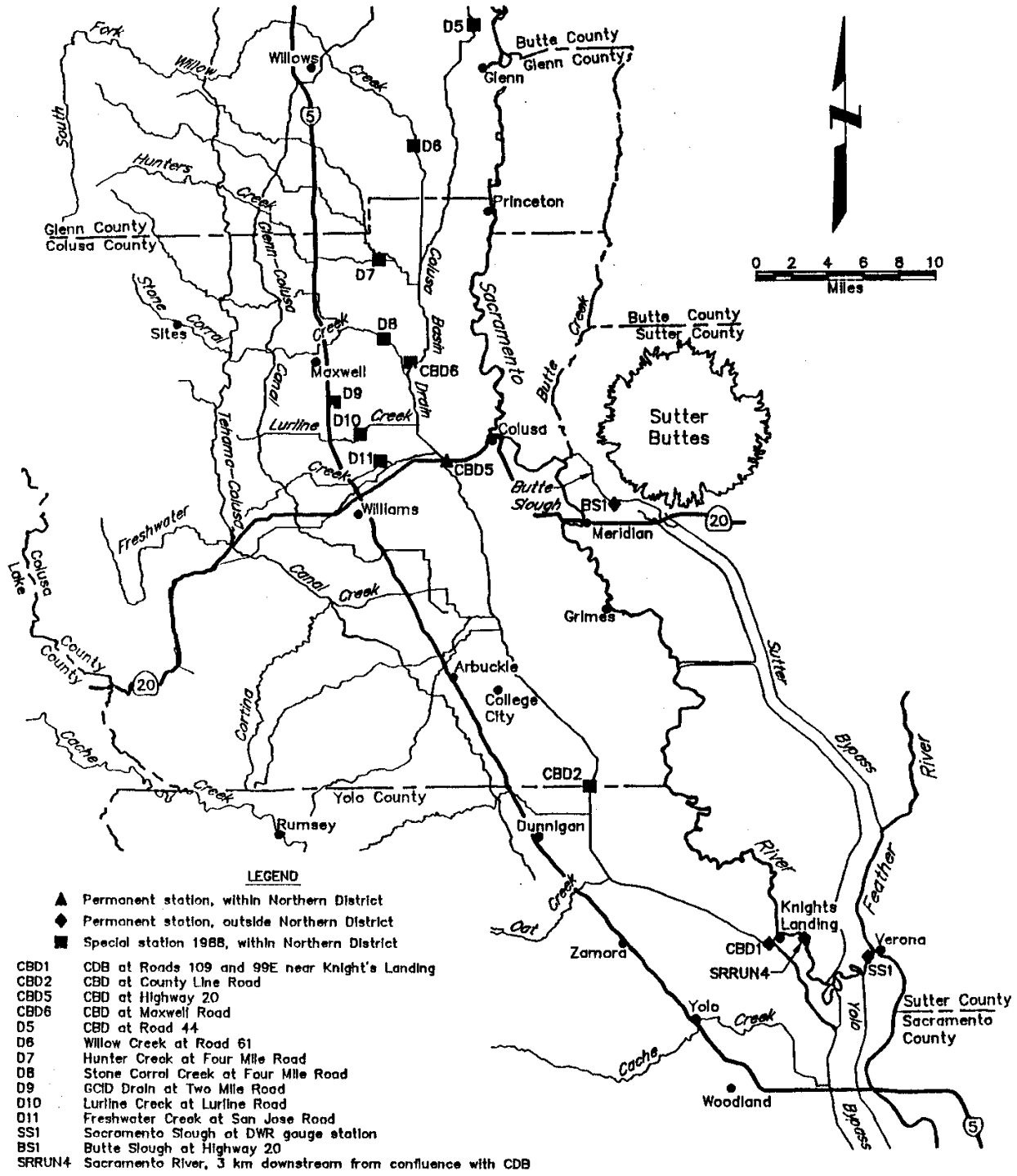


Figure 2. Rice Pesticide Program Monitoring Stations

now been restricted to those farms and districts which minimize thiobencarb discharge by using approved water management practices.

Bentazon is another rice pesticide which has recently been detected in agricultural drains and in the Sacramento River (SWRCB, 1984a). A primary action level of 8 ppb for bentazon has been recommended by DHS. Fields treated with bentazon can not be drained until harvest time. Because of this requirement, bentazon has almost been eliminated from the Sacramento River and the primary action level has never been in danger of being exceeded. The California registration of bentazon has been suspended and its use has not been permitted since 1989 (DFA, 1989a).

A new herbicide, bensulfuron methyl (Londax), has recently been developed and completed the registration process on April 26, 1989. It is expected to be widely used. It attacks broadleaf weeds and sedges as does bentazon. Bensulfuron methyl is applied in amounts of 1.65 oz of active ingredient/acre (DFA, 1989a) as compared to 1 lb/acre for other broadleaf herbicides or 4 lbs/acre for molinate and thiobencarb. When bensulfuron methyl was discharged after a 5 day holding period, concentrations were less than 5 ppb (DFA, 1989b). The detection limit is 0.5 ppb (DFA, 1989a). But since bensulfuron methyl is applied at the same time as molinate and thiobencarb, additional dissipation will occur because of the longer required holding periods. Full field discharge is required shortly after the molinate and thiobencarb holding period in order to prepare fields for bentazon applications, but this will no longer be necessary with bensulfuron methyl. Bensulfuron methyl also has some effect on grassy weeds, which may allow a reduction in the use of molinate and thiobencarb (DFA, 1989b).

No sites within the Northern District are monitored for bensulfuron methyl. So far, the highest concentration of bensulfuron methyl found was 2.08 ppb on May 29, 1989 at the Colusa Basin Drain near Knights Landing (DFA, 1989a; Appendix 1). An action level has not been established yet because bensulfuron methyl first needs to be considered a contaminant. Based on an EPA model, the Allowable Daily Intake (ADI) is estimated to be 1.4 ppm (Marshall Lee, DFA, pers. comm.).

Timber Pesticide Programs

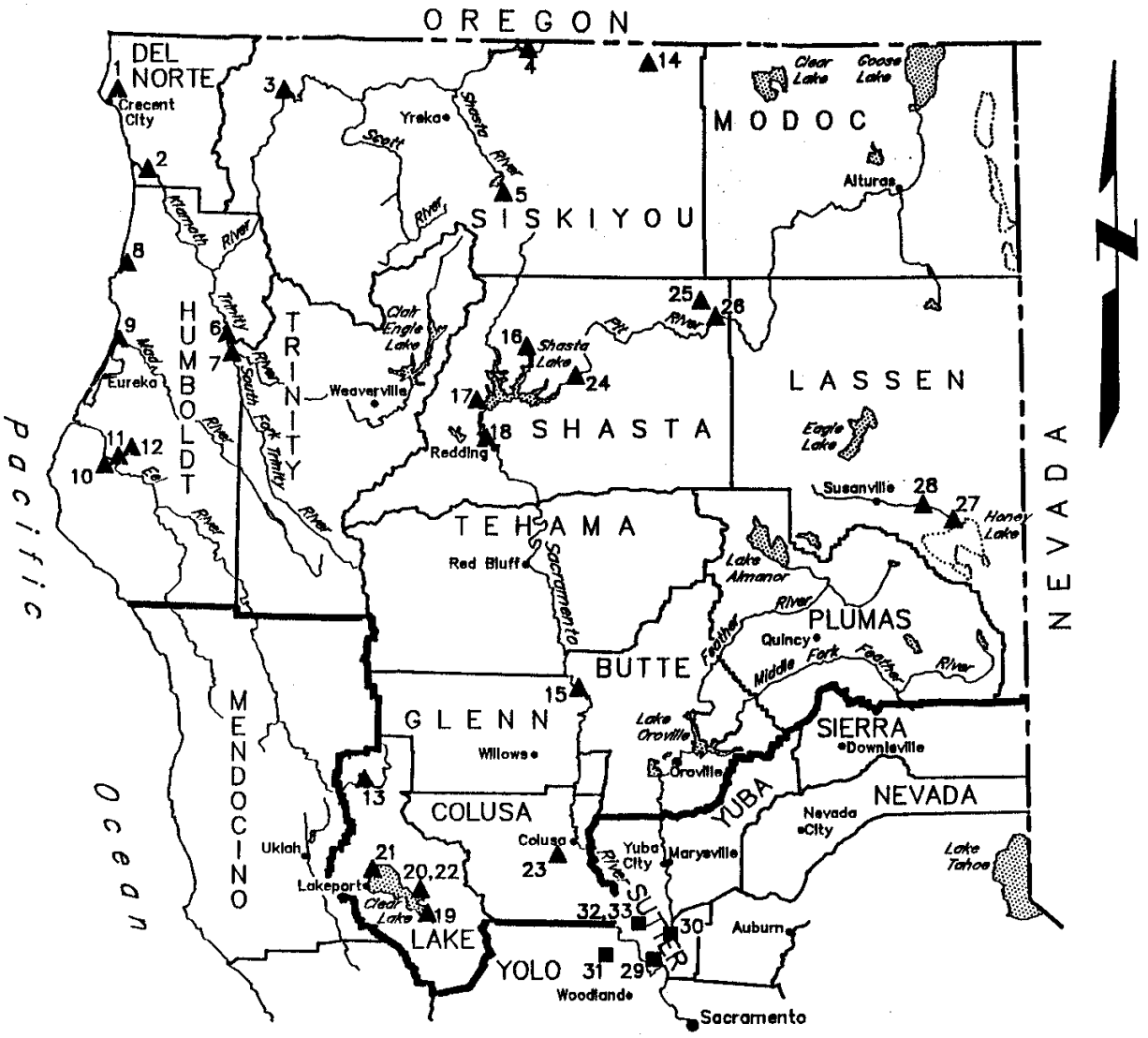
For several years, the NCRWQCB required the United States Forest Service (USFS) and private timber companies to monitor surface waters during and after aerial application of pesticides, such as 2,4-D and triclopyr (Garlon), on timber lands (NCRWQCB, 1985). The use of 2,4-D has been restricted since 1985. Garlon use is not restricted (Charles Green, NCRWQCB, pers. comm.). The results of this monitoring indicated that discharges of pesticides into streams did not occur in over 90% of the spray applications. Of those streams that did have pesticide residue, nearly all were under 10 ppb. The highest concentration found was 30 ppb. Timber companies are still required to monitor after aerial sprays.

In 1983, the SWRCB, the NCRWQCB, and the CVRWQCB studied the use of the pesticide 2,4-D to determine: 1) levels in surface waters during site treatment and subsequent rainfall, 2) whether State water quality objectives were being met at all times, and 3) the efficacy of present best management practices (BMP) in preventing discharges (SWRCB, NCRWQCB, CVRWQCB 1984; NCRWQCB, 1985). Eight sites were monitored in the North Coast and Central Valley regions (Del Norte, Shasta, and Modoc counties). A non-toxic dye tracer that could be detected by a fluorometer was used in the applications at two of the sites to aid in pesticide detection. The results of these studies showed that the State water quality objectives were being met. Some pesticide discharge did occur, but at levels determined to be within limits for the identified beneficial uses of water. The study proposed a number of recommendations concerning BMP's, monitoring, and laboratory analyses. Some of the recommendations are: 1) to routinely use a dye tracer in all aerial applications where beneficial water uses can be affected by the herbicide, 2) to have 2,4-D applicators routinely monitor during application and have Regional Boards observe and occasionally check monitoring activities, and 3) to revise and standardize BMP guidelines and County Agricultural Commissioner permit terms to call for 100 foot buffers along both sides of flowing and dry intermittent streams, and 5 mph or less wind velocities during 2,4-D application.

Toxic Substances Monitoring Program

The Toxic Substances Monitoring Program (TSMP) was begun in 1976 by the SWRCB and has been operated by the DFG. The purpose of the TSMP is to acquire current, consistant data that represent baseline and trend levels of toxic substances in selected streams and lakes throughout the state (SWRCB, 1985). The types of samples analyzed are primarily aquatic organisms, but occasionally soil, sediment, and water samples are also tested. The toxic substances monitored are trace elements and synthetic organic compounds. Pesticides are part of the latter. Tissues from fish and other aquatic organisms are analyzed on a wet weight basis and a lipid weight basis for the presence of organic compounds by gas chromatography. Lipid weight analyses have been made since 1984. These analyses better reflect the source concentrations of fat-soluble pesticides and show less variability than wet weight analyses. Wet weight analyses, however, are preferred because all standards for predator protection and human health are based on wet weight and they also better reflect the exposure of predators or humans to the actual concentrations in freshly caught fish (SWRCB, 1987).

Within the Northern District, 28 lake and stream stations have been monitored for pesticides at least once since the start of the program (Figure 3, Table 1). Five stations not within the Northern District but within the monitoring area are included in this investigation. Stations are not monitored every year. The SWRCB decides where monitoring should be done each year based primarily upon requests from the regional boards, but requests from other agencies are also considered. If no problems are found, or if the problems have been sufficiently



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▲ 16 TSMP monitoring stations within the Northern District.

■ 31 TSMP monitoring stations not within the Northern District but within the monitoring area.

NOTE: See Table 1 for station names.

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Figure 3. TSMP Pesticide Monitoring Stations 1978 – 1987

TABLE 1.
SUMMARY OF TOXIC SUBSTANCES MONITORING PROGRAM
STATIONS MONITORED EACH YEAR AND DETECTED PESTICIDES
WITHIN THE NORTHERN DISTRICT

STATION NAME	1978		1979		1980		1981		1982		1983		1984		1985		1986		1987	
	MON.	PEST.	MON.	PEST.	MON.	PEST.	MON.	PEST.	MON.	PEST.	MON.	PEST.	MON.	PEST.	MON.	PEST.	MON.	PEST.	MON.	PEST.
1 SMITH R /JED SMITH REDWOOD					X															
2 KLAMATH R /KLAMATH GLEN	X	a	X				X				X									
3 INDIAN CREEK /HAPPY CAMP					X												X			
4 KLAMATH R /COPCO RES																			X	g
5 BEAUGHTON CREEK																	X			
6 TRINITY R /WILLOW CR	X		X				X												X	
7 TRINITY R/D/S BURNT RANCH																			X	
8 BIG LAGOON							X	a					X	gh	X	g				
9 MAD RIVER							X						X						X	
10 EEL R /SCOTIA	X	a	X				X												X	
11 VAN DUZEN RIVER/MOUTH																			X	
12 YAGER CREEK/MOUTH							X												X	a
13 LAKE PILLSBURY																				
14 LOST RIVER/TULE LAKE							X	a												
15 SACRAMENTO R /HAMILTON CITY	X		X																	
16 MCCLOUD R /U/S MCCLOUD R BR							X												X	ab
17 SHASTA L /SQUAW CR ARM					X	a	X	a			*									
18 SACRAMENTO R /KESWICK											*									
19 CLEAR LAKE /LOWER LAKE											*									
20 CLEAR LAKE /SULPH BANK MINE							X	a			*									
21 CLEAR LAKE /RATTLESNAKE IS											*									
22 CLEAR LAKE /RODMAN SLOUGH					X	abcdef	X	abcdefghi												
23 COLUSA DRAIN /ABEL RD					X	a														
24 PIT R /PIT 7 POWERHOUSE													X	a						
25 FALL RIVER																			X	
26 PIT R/D/S HWY 299 BRIDGE																	X			
27 SUSAN R/ HONEY LAKE							X	ac			X									
28 SUSAN R /LITCHFIELD							X	abcdfj					X*	acdej	X	acdfjo			X	a
29 COLUSA DRAIN/KNIGHTS LAND +							X	acdfj	X	adf	X	adefj	X	acdefjlmn						
30 SUTTER BYPASS +					X	acdefjk	X	ac	X	a							X	adf	X	a
31 RECLAMATION SLOUGH +																			X	a
32 SACRAMENTO SLOUGH +																				
33 FEATHER R/D/S HWY 99 BR +																				

PESTICIDES:

a DDT
b DACTHAL
c DIELDRIN
d CHLORDANE
e TOXAPHENE
f TRANSNONACHLOR
g PENTACHLOROPHENOL (PCP)
h TETRACHLOROPHENOL (TCP)
i ALPHA HCH
j ENDOSULPHAN
k HEXACHLOROBENZENE
l DICOFOL
m CISNONACHLOR
n DICHLOROBENZOPHENONE P,P
o ALDRIN

X AQUATIC ORGANISM MONITORED AT THIS STATION
* SEDIMENT MONITORED AT THIS STATION
+ STATION NOT WITHIN NORTHERN DISTRICT BUT WITHIN THE MONITORING AREA

studied, the station will be dropped to make way for new stations elsewhere. This way, both the objectives of long term monitoring and monitoring as many stations as possible over time can be met (SWRCB,1986a). Samples are collected once each year from the chosen monitoring sites. Because the number of samples analyzed at each station in a single year is small, all concentrations detected are considered to be indicators of relative toxic pollution (SWRCB, 1984b).

Fifteen pesticides have been detected since 1978 within the Northern District monitoring area (Table 1, Appendix 2). DDT was the pesticide most often detected. Other pesticides that were often detected were chlordane, transnonachlor, dieldrin, endosulphan, and toxaphene. PCP and TCP are not part of the normal organic scan and were tested on the request of the NCRWQCB (SWRCB, 1987). Data from 1976 and 1977 are not included because different fish tissues were utilized and analytical techniques were still under development (SWRCB, 1984b).

Discussion

The greatest concern regarding pesticide use is the potential toxic effects. Domestic, agricultural, and recreational water supplies can be contaminated by pesticides. At high enough concentrations, pesticides become toxic to both people and aquatic life. Pesticides in water at toxic levels affect aquatic life directly and can cause death, but because many pesticides are capable of bioaccumulating, lower pesticide concentrations can also cause detrimental effects. People can be affected by drinking contaminated water, eating tainted fish, and perhaps through recreational use of surface waters. Guidelines and action levels, such as for rice pesticides, were developed to protect against such adverse effects.

The average yearly pesticide use in the 5 Sacramento Valley counties (Shasta, Tehama, Glenn, Butte, and Colusa) for the period of 1974 to 1987 was 4.6 million pounds and in all 13 counties in the Northern District was 5.3 million pounds (Table 2, Figure 4). The peak year was 1981 with a total use of 6.9 million pounds. Eighty-eight percent of all the pesticides applied in the Northern District are applied in the Sacramento Valley counties. Over 80% of all pesticides are applied to agriculture (DFA, 1974 - 1987), of which less than 15% of the total crop acreage is non-irrigated (Figure 5; DWR, 1974). Data from the most recent DWR Northern District land use surveys support this value. These data on pesticide use provide a good idea of where pesticide problems are likely to exist. Without a routine monitoring program, the amount of applied pesticides entering surface waters and possible problems they may cause are unknown.

Butte County has the highest average yearly pesticide use of all the Northern District counties, yet no routine monitoring is being done there. Most pesticide monitoring programs are developed only if a known problem exists. The rice pesticide program was developed after a

TABLE 2.
REPORTED PESTICIDE USE IN MILLION POUNDS
From Pesticide Use Reports
DFA, 1974 - 1987

NORTHERN DISTRICT

COUNTIES															
SAC VALLEY	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	AVERAGE
COLUSA	0.939	1.104	0.927		1.140	1.236	1.292	1.560	1.434	1.185	1.535	1.529	1.111	1.742	1.287
GLENN	0.626	0.814	0.827		1.103	1.004	1.447	1.591	1.348	1.067	1.205	1.069	0.935	1.583	1.125
BUTTE	1.156	1.299	1.070		1.661	1.839	1.966	2.069	2.012	1.613	1.656	1.280	1.002	1.746	1.567
TEHAMA	0.213	0.409	0.323		0.376	0.460	0.412	0.424	0.389	0.435	0.299	0.266	0.270	0.232	0.347
SHASTA	0.028	0.220	0.283		0.326	0.471	0.441	0.520	0.404	0.424	0.212	0.302	0.262	0.245	0.318
SUBTOTAL	2.962	3.846	3.430		4.606	5.010	5.558	6.164	5.587	4.724	4.907	4.446	3.580	5.548	4.644
OTHERS															
DEL NORTE	0.005	0.003	0.011		0.029	0.184	0.101	0.147	0.135	0.060	0.147	0.135	0.148	0.132	0.095
SISKIYOU	0.127	0.079	0.097		0.157	0.179	0.161	0.217	0.151	0.147	0.249	0.177	0.189	0.225	0.166
MODOC	0.069	0.079	0.185		0.121	0.148	0.124	0.176	0.124	0.107	0.137	0.324	0.201	0.172	0.151
HUMBOLDT	0.071	0.030	0.052		0.051	0.043	0.020	0.072	0.021	0.019	0.030	0.045	0.036	0.062	0.042
TRINITY	0.003	0.012	0.005		0.001	0.001	0.003	0.001	0.002	0.007	0.000	0.032	0.004	0.002	0.006
LASSEN	0.012	0.013	0.014		0.039	0.094	0.113	0.072	0.086	0.172	0.216	0.188	0.152	0.226	0.107
PLUMAS	0.002	0.002	0.016		0.011	0.008	0.009	0.010	0.008	0.006	0.009	0.003	0.008	0.021	0.009
LAKE	0.088	0.159	0.068		0.146	0.094	0.067	0.039	0.078	0.057	0.024	0.044	0.041	0.084	0.076
SUBTOTAL	0.377	0.377	0.448		0.555	0.751	0.598	0.734	0.605	0.575	0.812	0.948	0.779	0.924	0.652
TOTAL	3.339	4.223	3.878		5.161	5.761	6.156	6.898	6.192	5.299	5.719	5.394	4.359	6.472	5.296
SAC VALLEY % TOTAL	89%	91%	88%		89%	87%	90%	89%	90%	89%	86%	82%	82%	86%	88%

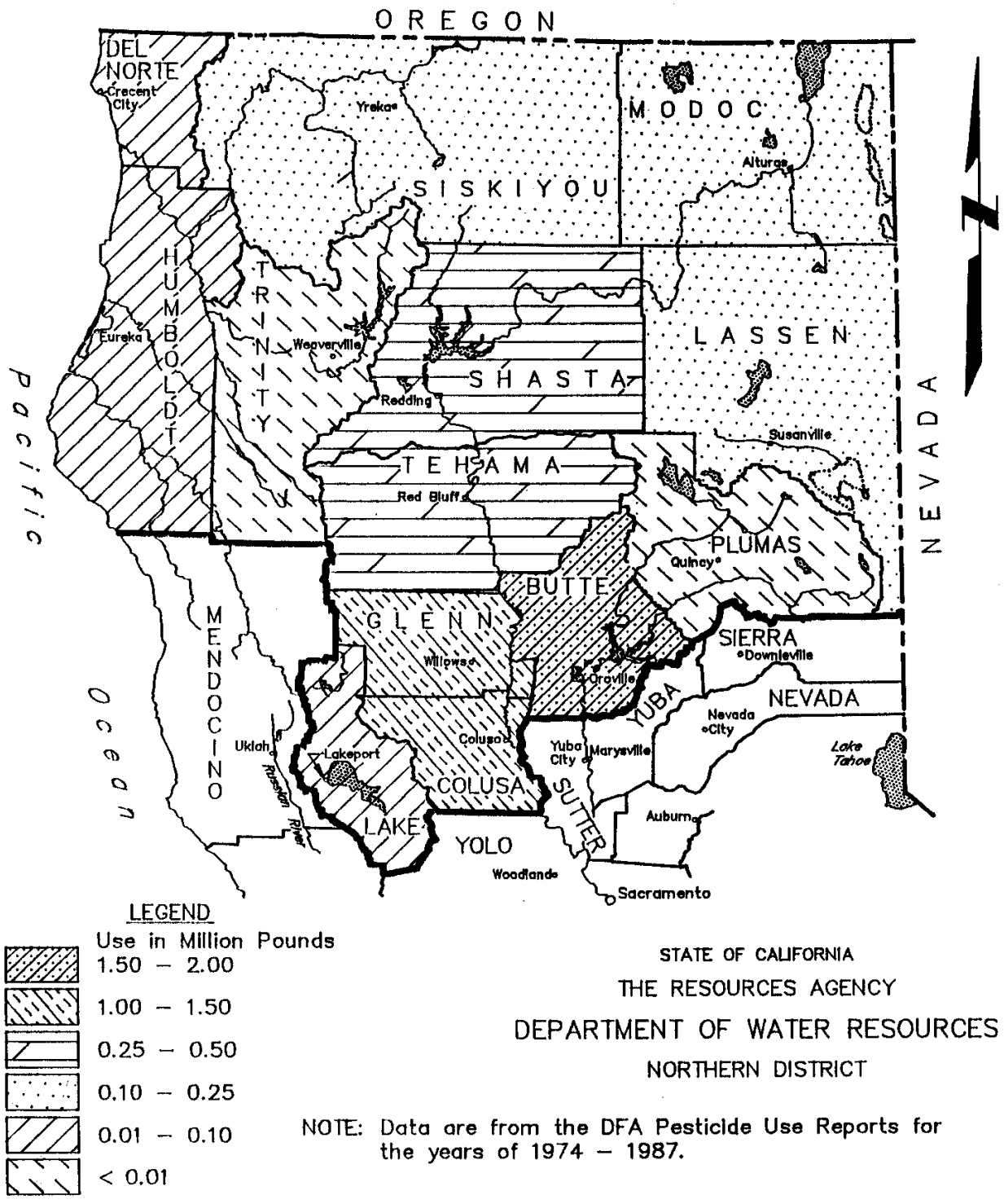
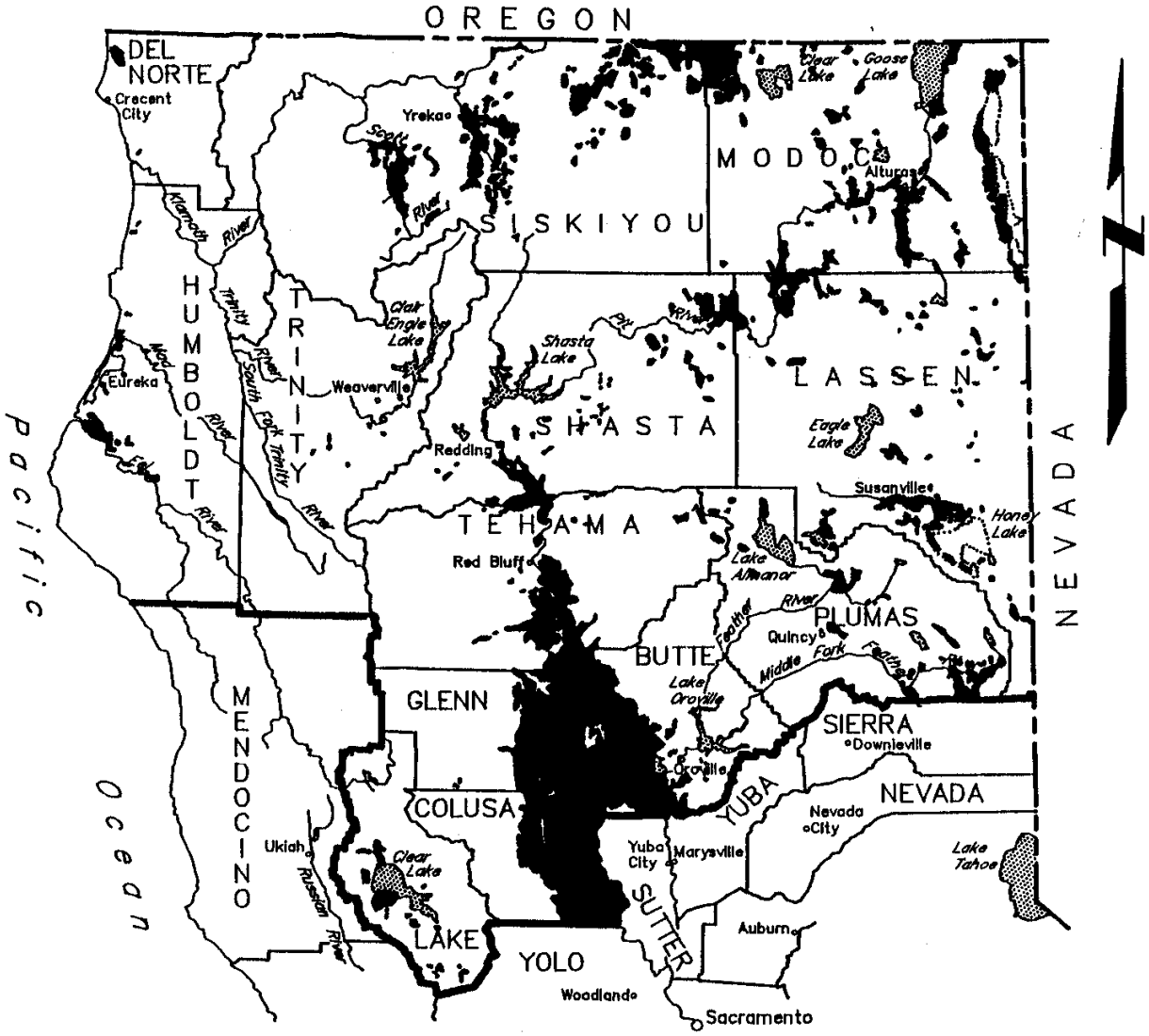


Figure 4. Average Yearly Pesticide Use



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Irrigated Land in the Northern District from Bulletin 160–87 (DWR 1987)

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Figure 5. Irrigated Land

large number of fish kills were discovered and bad taste complaints were made by the residents of the City of Sacramento.

The problems of rice pesticides and the solutions to these problems are being adequately addressed by the rice pesticide program. Because of this monitoring, some potential problem causing pesticides were detected and their use has thus been restricted. More effective rice management practices have also been developed. The timber pesticides programs have also adequately addressed the use and monitoring of the pesticide 2,4-D. Revised BMP's and monitoring program activities and techniques have been recommended.

A routine pesticide monitoring program would enable the detection and control of pesticides throughout the Northern District before any major problems come into existence, such as toxic effects on fish, wildlife, or people. Monitoring would also allow the determination of correct use of pesticides and best management practices. A successful pesticide monitoring program must be based on the type, application, and mobility of pesticides. The monitoring program should be coordinated with other agencies and organizations.

Pesticide runoff potential has been studied by the State Water Resources Control Board (SWRCB, 1986b). The SWRCB screened pesticides in surface runoff based on: 1) method of application, 2) timing of application relative to the first major storm, and 3) selected physical and chemical properties. It was found that many pesticides had a runoff loss of about 1 to 2% of the applied amount. Molinate and thiobencarb runoff losses ranged from 9 to 10.8% of the applied amount.

Even though there is no definitive relationship between the pesticide concentration observed in fish tissue samples and the actual concentration in water (SWRCB, 1984b), data developed over the past 10 years have shown that the best method for monitoring toxic substances in surface waters is to analyze the tissues of resident aquatic organisms (SWRCB, 1988). Oftentimes, concentrations of pesticides in water are too low to be detected with traditional methods of analyses. Many pesticides are not water soluble, but can be associated with sediment or organic matter (SWRCB, 1984b). Aquatic organisms will often bioaccumulate pesticide residues to levels which may be many hundreds of times the levels found in water, therefore making detection more probable.

Using a non-toxic dye during pesticide application as was done in the timber pesticide program could help in the detection of pesticides in surface water in other monitoring programs. Water samples could be taken when the fluorometer indicates the presence of dye and therefore the likely presence of pesticides.

High analytical cost is one of the main reasons why surface waters are not being routinely monitored for pesticides. Pesticide residue in surface water occurs in the parts per billion range and tests to detect pesticide residue at these levels may cost around $100 for each pesticide in a sample (Pace Laboratories, Inc., 1989).

Routine monitoring of surface waters for pesticides is needed (Peter Stoddard, DFA, pers. comm.). Right now there is no legal mandate for surface water monitoring like there is for groundwater (DFA Code Division 7, Chapter 2, Article 15) and air (DFA Code Division 7, Chapter 3, Article 1.5). Since cost for testing is the biggest problem, DFA is working on an enzyme-linked immunosorbent assay (ELISA) technique which uses antibodies to analyze pesticides. With the ELISA technique, 50 to 96 operations can be carried out simultaneously, which should greatly reduce the cost for analysis (Wie and Hammock, 1982). Antibodies for molinate and thiobencarb have already been developed. This new technique for testing of pesticides will hopefully soon be available to other State agencies.

Resolution No. 90-028 is an amendment of the July 1975 Water Quality Control Plan for the Sacramento River, Sacramento-San Joaquin Delta, and San Joaquin River Basins which updates the pesticide control program for surface waters (CVRWQCB, 1990). The CVRWQCB adopted this resolution on March 31, 1989, and the SWRCB has approved this edition. Water Quality Control Plans also exist for other basins. The goal of the Control Plans is to provide program actions to preserve and enhance water quality and protect beneficial uses. The pesticide control program sets limits on pesticide discharge concentrations in accordance with State and Federal regulations and also includes an implementaion plan to meet these set limits. Performance goals and discharge limits have already been established for molinate and thiobencarb. The program calls for surface water monitoring to be used to evalutate effectiveness and help prioritize control efforts. This monitoring will consist primarily of chemical analysis and biotoxicity testing of major water bodies that receive irrigation return flow.

Surface water monitoring by the CVRWQCB for the pesticide control program is now limited to rice pesticides (Rudy Schnagl, CVRWQCB, pers. comm.). A baseline monitoring program has not been set up mainly due to lack of funds and one is not forseen in the near future. Monitoring by others is needed and encouraged. All monitoring data should be made available to the CVRWQCB so that it may be used to help meet the goals of the Water Quality Control Plan.

Conclusions and Recommendations

Routine pesticide monitoring of surface waters within the Northern District is not being done in an adequate manner. Most monitoring only occurs when a problem, such as a large fish kill, is discovered. The rice pesticide program was developed for just such a reason. In the TSMP, only a few stations are monitored each year for pesticides, and samples are probably not being collected at the time of peak pesticide use. Butte County, which has the highest average yearly pesticide use, has not been monitored for the TSMP except once at the Sacramento River near Hamilton City.

Detectable amounts of pesticides in surface waters are only present during the application season or just shortly thereafter. A non-toxic dye used in the pesticide application may help

pinpoint the optimal time to take water samples. Aquatic organisms are considered to be a better indicator of the environment because of their ability to bioaccumulate in their tissues many of the pesticides that are used. Sampling of aquatic organisms is not quite as time dependent as is the sampling of surface water. Higher concentrations of pesticides in aquatic organisms than in surface waters allow easier detection.

A good pesticide monitoring program should be a coordinated effort with other agencies and organizations. The selection of many of its monitoring sites should be based upon where the majority of pesticides are being applied, as these areas are where problems are most likely to exist. Monitoring should also take place during the time of peak pesticide use so that possible worst case situations can be discovered. The type and mobility of pesticides used and the application process also needs to be considered. Such a pesticide monitoring program should enable the detection of pesticide contamination before any serious problems arise. The implementation plan of the CVRWQCB's pesticide control program of the Water Quality Control Plan calls for monitoring and management practices to minimize or eliminate the amount of pesticide discharge and would be a good plan to follow. The CVRWQCB has not set up a baseline monitoring program and will rely on the monitoring data collected by others to help them meet the Plan's goals.

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APPENDIX 1

DATA FROM RICE PESTICIDE PROGRAM
(DFA 1989a, DFA 1989b, SWRCB 1984a)

1989 MONITORING DATA
RICE HERBICIDE UPDATES
DFA 1989a
concentrations in water (ppb)

STATION	Date month - day 4-24	5-15	5-22	5-25	5-29	6-1	6-5	6-8	6-12	6-15	6-19	7-3
						MOLINATE						
CBD1	<1	14	36	40	44	NA	51	38	25	22	17	4
CBD5	<1	40	49	51	48	60	36	33	28	23	15	4
SS1	<1	1	5	12	14	23	30	22	24	23	16	5
BS1	<1	7	20	23	26	39	37	43	30	25	13	5
SRRUN4		<1		1	3	6	3	5	4	3	1	<1
SR1		<1		4	6	<1	5	5	3	2	DISC	
SR2		<1		1	2	4	2	4	3	2	<1	<1
SR3		<1		1	2	4	2	3	3	2	DISC	
SR4		<1		<1	1	2	3	2	3	3	DISC	
						BENSULFURON METHYL						
CBD1		<.5	0.9	0.98	2.08	1.79	2.0	1.34	1.63	0.82		
CBD5												
SS1			<.5		<.5	<.5	0.6	0.7	0.6	0.54		
BS1												
SRRUN4												
SR1			<.5		<.5	<.5	<.5	<.5	<.5	<.5		
SR2												
SR3												
SR4												

\+ CBD1 COLUSA BASIN DRAIN NEAR KNIGHTS LANDING IN YOLO CO.
* CBD5 COLUSA BASIN DRAIN AT HIGHWAY 20 IN COLUSA CO.
\+ SS1 SACRAMENTO SLOUGH AT DWR GAGE IN SUTTER CO.
\+ BS1 BUTTE SLOUGH AT HIGHWAY 20 IN SUTTER COUNTY
\+ SRRUN4 SACRAMENTO RIVER 3KM D/S CONFLUENCE CBD
SR1 SACRAMENTO RIVER AT VILLAGE MARINA IN SACRAMENTO CO.
SR2 SACRAMENTO RIVER AT FREEPORT BRIDGE IN SACRAMENTO CO.
SR3 SACRAMENTO RIVER AT WALNUT GROVE BOAT DOCK IN SACRAMENTO CO.
SR4 SACRAMNTO RIVER AT RIO VISTA MUNICIPAL DOCK IN SOLANO CO.

* STATION WITHIN NORTHERN DISTRICT
\+ STATION NOT WITHIN NORTHERN DISTRICT BUT WITHIN THE MONITORING AREA
NA NOT AVAILABLE
DISC DISCONTINUED

Data from DFA 1989b

Concentrations (ppb) of molinate (Ordram) detected at nine monitoring sites sampled in 1988.[1]

Sampling Date	Monitoring Site[2] CBD1	CBD5	SS1	DS1	SRBUND	SR1	SR2	SR3	SR4
4/25	1.0	3.0	<1.0	<1.0		<1.0			
5/2	24	9.0	<1.0	6.0		<1.0			
5/9	38	30	4.0	2.0		<1.0			
5/12	38	52	6.0	14	4.0	3.0	3.0	3.0	<1.0
5/16	62	69	7.0	23	6.0	5.0	4.0	3.0	2.0
5/19	60	76	30	49	11	7.0	6.0	4.0	2.0
5/23	61	89	25	31	2.0	6.0	5.0	6.0	3.0
5/26	67	83	18	33	12	8.0	5.0	5.0	5.0
5/30	55	52	22	52	12	8.0	7.0	7.0	4.0
6/2	44	40	29	35	6.0	6.0	6.0	7.0	3.0
6/6		31	24	33	8.0	7.0	7.0	7.0	4.0
6/9	26	21	24	45	6.0	6.0	5.0	5.0	5.0
6/13	18	17	20	30		4.0	4.0		
6/20	12	9.0	11	14		<1.0	<1.0		
6/27	7.0	5.0	6.0	7.0		<1.0	<1.0		

Concentrations (ppb) of molinate (Ordram) detected at nine sites within the drainage area of the Colusa Basin Drain sampled in 1988.[1]

Sampling Date	Monitoring Site[2] CBD2	CBD6	D5	D6	D7	D8	D9	D10	D11
5/19	61	97	58	27	104	45	35	44	16
5/23	75	88	66	28	305	21	21	46	48
5/26	62	68	38	33	85	50	70	99	43
5/30	58	44	37	18	27	63	40	66	27
6/2	58	38	30	15	49	35	24	104	18
6/9	26	19	15	11	33	9	10	14	16

1. Samples collected by the Department of Fish and Game and analyzed by ICI Americas Inc.

2. + CBD1 Colusa Basin Drain at Roads 109 and 99E near Knight's Landing in Yolo County.
   • CBD5 Colusa Basin Drain at Highway 20 in Colusa County.
   + SS1 Sacramento Slough at DWR gauge station in Sutter County.
   + DS1 Butte Slough at Highway 20 in Sutter County.
   + SRBUND Sacramento River, 3 km downstream from confluence with Colusa Basin Drain.
   SR1 Sacramento River at Village Marina in Sacramento County.
   SR2 Sacramento River at Freeport Bridge in Sacramento County.
   SR3 Sacramento River at Walnut Grove Boat Dock in Sacramento County.
   SR4 Sacramento River at Rio Vista Municipal Dock in Solano County.

   • CBD2 Colusa Basin Drain at County Line Road in Colusa and Yolo Counties.
   • CBD6 Colusa Basin Drain at Maxwell Road in Colusa County.
   • D5 Colusa Basin Drain at Road 44 in Glenn County.
   • D6 Willow Creek at Road 61 in Glenn County.
   • D7 Hunter Creek at Four Mile Road in Colusa County.
   • D8 Stone Corral Creek at Four Mile Road in Colusa County.
   • D9 Glenn-Colusa Irrigation District Drain at Two Mile Road in Colusa County.
   • D10 Lurline Creek at Lurline Road in Colusa County.
   • D11 Freshwater Creek at San Jose Road in Colusa County.

3. Blanks in table indicate that no samples were taken.

• WITHIN NORTHERN DISTRICT

+ NOT WITHIN NORTHERN DISTRICT BUT WITHIN THE MONITORING AREA

Data from DFA 1989b

Concentrations (ppb) of thiobencarb (Bolero) detected at nine monitoring sites sampled in 1988.[1]

Sampling Date	Monitoring Site[2] CD01	CD05	SS1	BS1	SRHHH4	SR1	SR2	SR3	SR4
4/25	<0.5	<0.5	<0.5	<0.5		<0.5	<0.5		
5/2	<0.5	<0.5	<0.5	<0.5		<0.5	<0.5		
5/12	<0.5	<0.5	<0.5	<0.5	0.5	<0.5	<0.5	<0.5	<0.5
5/16	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
5/19	0.6	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
5/23	1.4	0.6	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
5/26	0.6	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
5/30	0.6	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
6/2	3.6	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
6/6	1.7	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
6/9	3.3	<0.5	<0.5	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
6/13	2.8	<0.5	<0.5	<0.5		<0.5	<0.5		
6/20	1.5	<0.5	<0.5	1.0		<0.5	<0.5		
6/27	1.5	<0.5	<0.5	<0.5		<0.5	<0.5		

Concentrations (ppb) of thiobencarb (Bolero) detected at nine sites within the drainage area of the Colusa Basin Drain sampled in 1988.[1]

Sampling Date	Monitoring Site[2] CD02	CD06	D5	D6	D7	D8	D9	D10	D11
5/19	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
5/23	0.6	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
5/26	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
5/30	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
6/2	<0.5	0.6	<0.5	<0.5	1.6	<0.5	<0.5	<0.5	<0.5
6/9	<0.5	1.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5

1. Samples collected by the Department of Fish and Game and analyzed by Valent USA Corporation.

2. ✦ CD01 Colusa Basin Drain at Roads 109 and 99E near Knight's Landing in Yolo County.
   • CD05 Colusa Basin Drain at Highway 20 in Colusa County.
   ✝ SS1 Sacramento Slough at DWR gauge station in Sutter County.
   ✦ BS1 Butte Slough at Highway 20 in Sutter County.
   ✝ SRHHH4 Sacramento River, 3 km downstream from confluence with Colusa Basin Drain.
   SR1 Sacramento River at Village Marina in Sacramento County.
   SR2 Sacramento River at Freeport Bridge in Sacramento County.
   SR3 Sacramento River at Walnut Grove Boat Dock in Sacramento County.
   SR4 Sacramento River at Rio Vista Municipal Dock in Solano County.

   • CD02 Colusa Basin Drain at County Line Road in Colusa and Yolo Counties.
   • CD06 Colusa Basin Drain at Maxwell Road in Colusa County.
   • D5 Colusa Basin Drain at Road 44 in Glenn County.
   • D6 Willow Creek at Road 61 in Glenn County.
   • D7 Hunter Creek at Four Mile Road in Colusa County.
   • D8 Stone Corral Creek at Four Mile Road in Colusa County.
   • D9 Glenn-Colusa Irrigation District Drain at Two Mile Road in Colusa County.
   • D10 Lurline Creek at Lurline Road in Colusa County.
   • D11 Freshwater Creek at San Jose Road in Colusa County.

3. Blanks in table indicate that no samples were taken.

• WITHIN NORTHERN DISTRICT

✝ NOT WITHIN NORTHERN DISTRICT BUT WITHIN THE MONITORING AREA

Data from DFA 1989b

Concentrations (ppb) of molinate (Ordram) and thiobencarb (Bolero) in the Sacramento River at the intake to the City of Sacramento water treatment facility in 1988.

Sampling Date	Concentration (ppb) molinate	thiobencarb	Sampling Date	Concentration (ppb) molinate	thiobencarb
5/3	<0.10	<0.10	5/28	3.6	<0.10
5/5	0.22	<0.10	5/29	3.2	0.10
5/6	0.11	<0.10	5/30	3.4	<0.10
5/7	<0.10	<0.10	5/31	3.8	<0.10
5/8	<0.10	<0.10	6/1	3.8	0.13
5/9	<0.10	<0.10	6/2	4.1	0.13
5/10	1.6	<0.10	6/3	4.0	0.21
5/11	1.2	<0.10	6/4	3.0	0.11
5/12	0.81	<0.10	6/5	3.7	0.13
5/13	0.91	<0.10	6/6	3.8	0.14
5/14	1.1	<0.10	6/7	3.4	0.15
5/15	1.5	<0.10	6/8	2.3	0.15
5/16	1.8	<0.10	6/9	2.0	0.13
5/17	2.4	<0.10	6/10	2.3	0.15
5/18	4.5	<0.10	6/11	2.0	0.15
5/19	4.9	<0.10	6/12	1.7	0.13
5/20	4.8	<0.10	6/13	1.1	0.12
5/21	4.7	<0.10	6/14	1.2	<0.10
5/22	3.9	<0.10	6/15	1.1	<0.10
5/23	2.6	<0.10	6/16	0.7	<0.10
5/24	1.8	<0.10	6/17	0.52	<0.10
5/25	1.9	<0.10	6/20	0.29	<0.10
5/26	3.4	<0.10	6/22	0.27	<0.10
5/27	3.5	<0.10	6/24	0.20	<0.10

Samples collected and analyzed by the City of Sacramento.

Concentrations (ppb) of bentazon (Basagran) during 1988 in the Sacramento River at Sacramento at the intake to the water treatment facility and in water at the facility that had undergone all standard treatment steps.[1]

Sampling Date	Monitoring Site[2] SRH	SRF
5/24	<0.5	<0.5
6/3	<0.5	<0.5
6/10	<0.5	<0.5
6/17	<0.5	<0.5
6/24	<0.5	<0.5
7/1	<0.5	<0.5
8/25	<0.5	<0.5
8/28	<0.5	<0.5
8/31	<0.5	<0.5
9/3	<0.5	<0.5
9/4	0.53	<0.5
9/5	0.53	<0.5
9/6	<0.5	<0.5
9/8	<0.5	<0.5
9/11	<0.5	<0.5
9/14	<0.5	<0.5
9/17	<0.5	<0.5

1. Samples collected and analyzed by the City of Sacramento.

2. SRH Sacramento River at Sacramento at the intake to the municipal water treatment facility.

   SRF Sacramento River water treatment facility in Sacramento where the treated water enters the distribution system.

Concentrations of carbaryl (Sevin) and carbofuran (Furadan) in the Sacramento River at Sacramento at the intake to the water treatment facility in 1988.

Sampling date	Concentration (ppb) carbaryl	carbofuran
5/7	<0.5	<1.0
5/10	<0.5	<1.0
5/11	<0.5	<1.0

Samples collected and analyzed by the City of Sacramento.

Data from DFA 1989b

Concentrations (ppb) of bentazon (Basagran) detected at three monitoring sites sampled in 1988.[1]

Sampling Date	Monitoring Site[2] CBD1	SS1	SR1
5/23	<0.5	<0.5	<0.5
5/30	0.5	<0.5	<0.5
6/2	0.6	0.5	<0.5
6/6	0.8		<0.5
6/9	1.3	0.6	<0.5
6/20	1.3	0.9	<0.5
6/23	2.1	1.2	0.5
6/27	4.1	2.3	<0.5
6/30	3.7	2.0	<0.5
7/4	5.5	2.6	<0.5
7/11	5.3	2.0	<0.5
7/18	3.3	2.5	<0.5
7/25	2.7	1.6	<0.5
8/1	2.1	2.0	<0.5
8/8	2.1	3.0	<0.5
8/15	1.5	2.1	<0.5
8/22	2.1	1.8	<0.5
8/25	2.1	2.8	0.6
8/29	1.7	2.0	<0.5
9/1	2.3	2.4	0.6
9/5	2.1	2.2	0.6
9/8	1.8	1.8	0.6
9/12	2.4	1.7	0.8
9/15	1.7	1.5	0.6
9/19	1.3	1.2	0.5
9/26	0.9	1.0	<0.5

1. Samples collected by the Department of Fish and Game and analyzed by Enseco - California Analytical Laboratory.

2. CBD1 Colusa Basin Drain at Roads 109 and 99E near Knight's Landing in Yolo County.
   SS1 Sacramento Slough at DWR gauge station in Sutter County.
   SR1 Sacramento River at Village Marina in Sacramento County.

Concentrations (ppb) of propanil detected at two monitoring sites sampled in 1988.[1]

Sampling Date	Monitoring Site[2] CBD1	SR1
5/23	<0.5	<0.5
5/26	<0.5	<0.5
5/30	<0.5	<0.5
6/2	1.1	<0.5
6/6	<0.5	<0.5
6/9	<0.5	<0.5
6/13	<0.5	<0.5
6/16	<0.5	<0.5
6/20	<0.5	<0.5
6/23	<0.5	<0.5
9/6	<0.5	<0.5
9/8	<0.5	<0.5
9/12	<0.5	<0.5
9/15	<0.5	<0.5

1. Samples collected by the Department of Fish and Game and analyzed by Enseco - California Analytical Laboratory.

2. CBD1 Colusa Basin Drain at Roads 109 and 99E near Knight's Landing in Yolo County.
   SR1 Sacramento River at Village Marina in Sacramento County.

Data from DFA 1989b

Concentrations (ppb) of carbofuran (Furadan) detected at three monitoring sites sampled in 1988.[1,4]

Date	Monitoring Site[3] CBD1	SS1	SR1
4/25	5.4	<1.0	<1.0
4/28	3.8	<1.0	<1.0
5/2	2.7	1.2	<1.0
5/5	1.5	1.2	<1.0
5/9	3.2	1.0	<1.0
5/12	2.0	2.1	<1.0
5/16	1.4	1.8	<1.0
5/19	1.4	1.4	<1.0
5/23	<1.0	1.2	<1.0
5/26	<1.0	<1.0	<1.0
5/30	<1.0	<1.0	<1.0
6/2	<1.0	<1.0	<1.0
6/6	<1.0	<1.0	<1.0
6/9	<1.0	<1.0	<1.0

1. Samples collected by the Department of Fish and Game and analyzed by FMC Corporation.

2. Samples were also analyzed for the presence of 3-hydroxycarbofuran and 3-ketocarbofuran. Concentrations were below 1.0 ppb, the detection limit of each compound.

3. CBD1 Colusa Basin Drain at Roads 109 and 99E near Knight's Landing in Yolo County.
   SS1 Sacramento Slough at DWR gauge station in Sutter County.
   SR1 Sacramento River at Village Marina in Sacramento County.

4. Analyses performed by the California Department of Fish and Game.

Concentrations (ppb) of carbaryl detected at two monitoring sites sampled in 1988.[1]

Sampling Date	Monitoring Site[2] CBD1	SR1
6/1	<5.0	<5.0
6/7	<5.0	
6/15	<5.0	<5.0
6/22	<5.0	<5.0
6/25	<5.0	<5.0
6/29	<5.0	<5.0

1. Samples collected by the Department of Fish and Game and analyzed by Ensaco - California Analytical Laboratory.

2. CBD1 Colusa Basin Drain at Roads 109 and 99E near Knight's Landing in Yolo County.
   SR1 Sacramento River at Village Marina in Sacramento County.

Data from SWRCB 1984a

SUMMARY OF MOLINATE AND THIOBENCARB CONCENTRATIONS IN AGRICULTURAL DRAIN EFFLUENT DISCHARGING TO THE SACRAMENTO RIVER

MOLINATE

AGRICULTURAL DRAIN [1] (Station)	YEAR	SURVEILLANCE PERIOD	OBSERVATIONS (n)	CONCENTRATION RANGE (ug/l)	DURATION OF DETECTION (Date)	REFERENCE
Colusa Basin Drain	1983	4/27-7/11	17	<1.0-211 [2b]	54 Days (5/18-7/11)	Finlayson and Lew, 1983b
	1982	5/6-7/14	16	<1.0-204 [2a]	47 " (5/21-7/7)	Finlayson and Lew, 1983a
	1981	3/9-9/28	29	<1.0-310	77 " (4/27-7/13)	Tanji et al., 1982
	1981	4/30-8/14	16	10-340	74 " (4/30-7/14)	Finlayson et al., 1982
	1980	2/19-12/15	25	<1.3-190	ND [3]	Tanji et al., 1982
	1980	6/10-9/8	8	<1.0-60	--	Finlayson et al., 1982
Reclamation Slough [4] (RD1500)	1982	5/6-7/14	16	<1.0-82 [2a]	47 " (5/21-7/7)	Finlayson and Lew, 1983a
	1981	4/30-8/14	16	<1.0-187	75 " (4/30-7/14)	Finlayson et al., 1982
Sycamore Slough (RD108)	1983	6/7-6/21	3	11-60	--	Cornacchia and Schnagl, 1983
	1982	5/6-7/14	16	<1.0-187 [2a]	49 " (5/25-7/14)	Finlayson and Lew, 1983a
Sacramento Slough	1983	4/27-7/11	17	< 1-68 [2b]	46 " (5/26-7/11)	Finlayson and Lew, 1983b
Butte Slough	1982	5/6-7/14	16	<1.0-187 [2a]	47 " (5/21-7/7)	Finlayson and Lew, 1983a
Natomas Drain (RD1000)	1983	6/7-6/21	3	14-90	ND	Cornacchia and Schnagl, 1983
	1982	5/6-7/14	16	<1.0-141	47 " (5/21-7/7)	Finlayson and Lew, 1983a
	1976	5/18-7/20	9	<20-210	42 " (5/25-7/6)	Van de Pol and Plescia, 1978
Liberty Cut [5]	1983	6/23	2	59,84 [6 b,c]	ND	Cornacchia and Schnagl, 1983
Toe Drain [5]	1983	6/17	1	98	ND	"
		6/23	3	57,75,67 [6b,c,d]	ND	"

THIOBENCARB

Colusa Basin Drain	1983	4/27-7/11	17	<0.5-11.3 [6]	43 days (5/31-7/11)	Finlayson and Lew, 1983b
	1982	5/6-7/14	16	<1.0-57	40 " (5/21-6/30)	Finlayson and Lew, 1983a
	1981	4/30-8/14	16	<1.0-21	49 " (5/12-6/30)	Finlayson et al., 1982
Reclamation Slough (RD1500)	1982	5/6-7/14	16	<1.0-48	47 " (5/21-7/7)	Finlayson and Lew, 1983a
	1981	4/30-8/14	16	<1.0-39	28 " (5/18-6/15)	Finlayson et al., 1982
Sycamore Slough (RD108)	1982	5/6-7/14	16	<1.0-110	40 " (5/21-6/30)	Finlayson and Lew, 1983a
Sacramento Slough	1983	4/27-7/11	17	<0.5-4.9 [6]	38 " (6/3-7/11)	Finlayson and Lew, 1983b
Butte Slough	1982	5/6-7/14	16	<1.0-10	36 " (5/25-6/30)	Finlayson and Lew, 1983a
Natomas Drain (RD1000)	1983	6/17-6/21	3	2.3-14	ND [3]	Cornacchia and Schnagl, 1983
Liberty Cut [5]	1983	6/23	3	2.5, 3.0, 3.4 [6a,b]	ND	"
Toe Drain [5]	1983	6/17	1	3.3	ND	"
		6/23	4	2.5, 2.7 [6a,c] 2.4, 3.0	ND	"

1/ Data selected from stations located near the outfall to the Sacramento River.

2/ Molinate (a) split and (b) replicate analyses performed by Stauffer Chemical Company (STC). Refer to Appendix 2 for analytical methods.

3/ ND: Not determined due to insufficient data.

4/ Discharges to the Sacramento River via Sacramento Slough.

5/ Discharges to the Northern Delta at Prospect Slough.

6/ Thiobencarb replicate analysis performed in part by (a) Chevron Chemical Company (CCC), (b) STC, (c) DFG, or (d) California Analytical.

Data from SWRCB 1984a

MOLINATE AND THIOBENCARB CONCENTRATIONS DETECTED IN THE SACRAMENTO RIVER NEAR SACRAMENTO (CA)

MOLINATE

RIVER STATION	YEAR	SURVEILLANCE PERIOD	OBSERVATIONS 1/ (n)	CONCENTRATION RANGE (ug/l)	DURATION OF DETECTION (DATE)	REFERENCE 2/
Sacramento City Water Treatment Plant (Intake) (.25 mi. d s American River)	1983	4/11 - 7/15	39	<0.3 - 2.0	26 (6/8 - 7/4)	b
	1982	5/19 - 7/12	16	<1.5 - 13	33 (5/30 - 6/30)	a
Sacramento City Water Treatment Plant (Tap Water)	1983	6/10 - 6/30	5	<.1	Not detected	b
	1982	6/2 - 7/12	13	<0.3	Not detected	a
Village Marina (.25 mi. u/s American River)	1983	4/27 - 7/11	17 3/	<1.0 - 20.0	46 (5/11 - 6/27)	d
	1982	5/6 - 7/14	16 3/	<1.0 - 27	47 (5/21 - 7/7)	c
Crawlad Landing (.5 mi. u/s American River)	1983	5/30 - 7/15	22	<0.3 - 4.0	28 (6/6 - 7/4)	b

THIOBENCARB

Sacramento City Water Treatment Plant (Intake) (.25 mi. d/s American River)	1983	4/11 - 7/15	40	<0.1 - 0.38	13 (6/13 - 6/26)	b
	1982	6/9 - 7/12	10	<1.5 - 2.1	12 (6/9 - 6/21)	a
Sacramento City Water Treatment Plant (Tap Water)	1983	6/10 - 6/30	5	<0.10	Not detected	b
	1982	6/2 - 7/12	10	<0.1	Not detected	a
Village Marina (.25 mi. u/s American River)	1983	4/27 - 7/11	17 4/	<1.0	Not detected	d
	1982	5/6 - 7/14	16	<1.0 - 6.0	25 (5/28 - 6/22)	c
Crawlad Landing (.5 mi. u/s American River)	1983	5/30 - 7/15	22	<0.1 - 0.45	29 (6/6 - 7/5)	b

1/ Surface grab sample collected midchannel (by boat (B) or from shore (S).

2/ a= Sacramento City, 1982
b= Sacramento City, 1983
c= Finlayson and Lew, 1983a
d= Finlayson and Lew, 1983b

3/ Split replicates to be analyzed by Stauffer Chemical Company.

4/ Split replicates to be analyzed by Chevron Chemical Company.

Data from SWRCB 1984a

THIOBENCARB CONCENTATIONS* FROM WATER SAMPLES
COLLECTED AT 1982 MONITORING LOCATIONS

	Monitoring Locations								
Date	RS1	CBD1	RD108	CBD5	BS1	SBP1	FR1	ND1	SR1
May 6	<1	<1	<1	<1	<1	<1	<1	<1	<1
May 11	<1	<1	<1	<1	<1	<1	<1	<1	<1
May 21	3	17	14	5	<1	<1	<1	<1	<1
May 25	7	13	35	170	1	<1	<1	2	<1
May 28	16	40	29	25	<1	2	<1	21	1
June 1	18	57	83	33	7	7	<1	53	3
June 4	48	50	110	35	10	7	6	45	5
June 8	27	29	5	10	6	14	<1	66	6
June 11	11	30	41	11	5	9	<1	99	5
June 15	21	9	30	6	4	39	<1	94	4
June 18	12	13	3	65	5	5	<1	68	<1
June 22	3	3	4	1	6	2	<1	25	1
June 25	2	3	3	3	9	1	<1	10	<1
June 30	2	2	3	2	2	<1	<1	6	<1
July 7	1	<1	<1	<1	<1	<1	<1	5	<1
July 14	<1	<1	<1	<1	<1	<1	<1	2	<1

* ug/l, or ppb

Data from SWRCB 1984a

STATE WATER RESOURCES CONTROL BOARD
CENTRAL VALLEY REGIONAL WATER QUALITY CONTROL BOARD
1983 RICE CHEMICAL MONITORING

Analysis Results by Site

A. Sacramento River

DATE	LOCATION	LABORATORY[1]	CONCENTRATION (ug/l)[2] MOLINATE	THIOBENCARB
6/16	Sacramento River 0.5 mile upstream of Reclamation District 108 drainage pumps	CAL	<0.2	<0.2
		DFG	<1.0	<1.0
	Sacramento River 1 mile upstream of Knight's Landing	CAL	<0.2	<0.2
		DFG	<1.0	<1.0
	Sacramento River 2 miles downstream of Knight's Landing	CAL	1.9	0.62
		DFG	<1.0	<1.0
	Sacramento River 2 miles downstream of Feather River	CAL	5.4	0.65
		DFG	5.1	<1.0
	Sacramento River at Interstate 880 Bridge	CAL	4.0	<0.2
		DFG	3.2	<1.0
6/6	Sacramento River at Village Marina	CAL	1.9	<1.0
6/8		CAL	2.1	<1.0
		CHEV	---	0.0
6/10		CAL	3.9	0.25
6/13		CAL	6.9	1.4
6/15		CAL	4.3	0.39
6/16		CAL	3.8	<0.2
		DFG	2.7	<1.0
6/21			4.3	0.45
5/26	Sacramento River at Freeport	CAL	<1	<1
		"	<1	<1
		"		[3]
		"		
6/17		CAL	1.1	<0.2
		"	1.23	
5/26	Sacramento River at Walnut Grove	CAL	<1.0	<1.0
		"	<1.0	<1.0
		CAL		[3]
		"		
6/17		CAL	3.4	0.75
		"	3.5	0.44
6/21		RAD	ND	ND

STATE WATER RESOURCES CONTROL BOARD
CENTRAL VALLEY REGIONAL WATER QUALITY CONTROL BOARD
1983 RICE CHEMICAL MONITORING (CONT'D)

Analysis Results by Site

A. Sacramento River (continued)

DATE	LOCATION	LABORATORY[1]	CONCENTRATION (ug/l)[2] MOLINATE	THIOBENCARB
5/26	Sacramento River at Rio Vista (Highway 12 bridge)	CAL	<1	<1
		"	<1	<1
		"		3/
		"		"
6/23	Sacramento River near Rio Vista (Bouy 36)	CAL	10	<0.5
		STCHEM	12	1.0
		CHEV	--	0.5
		DFG	9.0	<1.0

1/ CAL = California Analytical Labs, Sacramento
CHEV = Chevron Chemical Co., Richmond
DFG = California Department of Fish and Game
RAD = Radian Corporation, Sacramento
STCHEM = Stauffer Chemical Co., Richmond

2/ Detection Limits in ug/l:

	Molinate	Thiobencarb
CAL	0.5	0.5
CHEV	--	0.5
DFG	1.0	1.0
RAD	1.0	1.0
STCHEM*	0.1	0.1
STCHEM**	1.0	1.0

ND = Not detected at the specified detection limit.

* For samples taken from Cache Slough at Vallejo Pipeline intake.

** All other sites.

3/ Xylene <5 ug/l (EPA 624 Method used for analysis.)

Data from SWRCB 1984a

REPORTED FISH KILLS INVOLVING RICE FIELD WATER. (CALIFORNIA DEPARTMENT OF FISH AND GAME)[1/]

LOCATION	DATE	CERTAINTY OF CAUSE: KNOWN[2/]	PROBABLE[3/]	POSSIBLE[4/]	APPROXIMATE NUMBER	SPECIES
Drain entering Butte Creek	5/15/65			X	1000 25	Carp Catfish
Biddy-cut and Colusa Drainage Canal	5/31/73			X	1000 50 50 50	Carp Catfish Crappie Black bass
Late Pond near Pleasant Grove	6/4/75		X		1272 400 42	Carp Catfish Bluegill
Colusa County near Gridley	5/24/76		X		1-50	Catfish
Butte Creek and its tributaries north of Gridley-Colusa Hwy.	6.18/76			X	1000+ 500+ 100+ 100	Carp Catfish Bass Sunfish
Butte Creek	6/10/77			X	1000 50	Carp Catfish
Colusa Basin Drain and Reclamation Slough	Late May-Early June/ 1980	X			30,000	Carp (>75%)
" "	Late May-early June/ 1981	X			30,000	Carp (>75%)
Colusa Basin Drain and Sutter Bypass	Early June/ 1982	X			13,000[5/] 1,000	Carp Catfish
Jamison Lake, 1½ mile east of Gilling (2067) Canal	6/4/83		X		1,000 500 200 250	Carp Catfish Black bass Crappie
Colusa Basin Drain	Early June/ 1983	X			7,000	Carp

1 1965-1981 fish kill compendiums: Finlayson et al., 1982 and 1983a-b.

2 Cause known to be Molinate (rice herbicide) from gas chromatographic (thermionic specific) analysis of fish tissue and water.

3 Probably caused by rice field water but specific compound not identified or proven by laboratory analysis.

4 Possibly caused by rice field water but no actual determination.

5 Brian Finlayson, personal communication.

APPENDIX 2

SUMMARY OF TSMP DATA
1978 - 1987
ORGANIC CHEMICAL MONITORING
WITHIN THE NORTHERN DISTRICT
(SWRCB, 1984b, 1985, 1986a, 1987)

Note: 1986 summary data does not contain monitoring for pentachloraphenol(PCP) or tetrachloraphenol(TCP). 1987 summary data does not contain monitoring for TCP.

1978 ORGANIC CHEMICALS IN FISH (ppb, wet weight)

STATION	STATION NAME	COMMON NAME	TISSUE TYPE	SAMPLE DATE	ALDRIN	ATRAZINE	BENEFIN	CARBARYL	CARBO PHENO THIONIN	CDEC	CHLOR BENSIDE
105.11.08	KLAMATH R / KLAM GLEN	FRESHWATER MUSSEL	WHOLE	78-07-25	·5	N	·5	·600	·20	·15	·10
105.11.08	KLAMATH R / KLAM GLEN	SUCKER	FLESH	78-07-25	·5	N	·5	·600	·20	·15	·10
105.11.08	KLAMATH R / KLAM GLEN	SCULPIN	FLESH	78-07-25	·5	N	·5	·600	·20	·15	·10
106.12.03	TRINITY R / WILLOW CK	SUCKER	FLESH	78-07-27	·5	N	·5	·600	·20	·15	·10
106.12.03	TRINITY R / WILLOW CK	SCULPIN	FLESH	78-07-27	·5	N	·5	·600	·20	·15	·10
111.12.01	EEL R / SCOTIA	FRESHWATER MUSSEL	WHOLE	78-07-24	·5	N	·5	·600	·20	·15	·10
111.12.01	EEL R / SCOTIA	SACRAMENTO SUCKER	FLESH	78-07-24	·5	N	·5	·600	·20	·15	·10
111.12.01	EEL R / SCOTIA	SCULPIN	FLESH	78-07-24	·5	N	·5	·600	·20	·15	·10
526.22.00	MCCLOUD R/SHASTA LAKE	CADDISFLY LARVAE	WHOLE	78-08-21	·5	N	·5	·600	·20	·15	·10
526.22.00	MCCLOUD R/SHASTA LAKE	SACRAMENTO SUCKER	FLESH	78-08-21	·5	N	·5	·600	·20	·15	·10
526.22.00	MCCLOUD R/SHASTA LAKE	BROWN TROUT	FLESH	78-08-21	·5	N	·5	·600	·20	·15	·10

STATION	ALPHA CHLORDENE	CIS CHLORDANE	GAMMA CHLORDENE	TRANS CHLORDANE	TOTAL CHLORDANE	CHLORONEB	CHLOR PYRIFOS	DACTHAL	D-D	DDD O,P	DDD P,P	DDE O,P	DDE P,P	DDMS P,P	DDMU P,P	DDT O,P	DDT P,P	TOTAL DDT
105.11.08	N	·5	N	·5	D	·50	·10	·5	N	·10	5	·10	5	·5	·5	·10	·5	10
105.11.08	N	·5	N	·5	D	·50	·10	·5	N	·10	·5	·10	·5	·5	·5	·10	·5	D
105.11.08	N	·5	N	·5	D	·50	·10	·5	N	·10	·5	·10	·5	·5	·5	·10	·5	D
106.12.03	N	·5	N	·5	D	·50	·10	·5	N	·10	·5	·10	·5	·5	·5	·10	·5	D
106.12.03	N	·5	N	·5	D	·50	·10	·5	N	·10	·5	·10	·5	·5	·5	·10	·5	D
111.12.01	N	·5	N	·5	D	·50	·10	·5	N	·10	·5	·10	·5	·5	·5	·10	·5	D
111.12.01	N	·5	N	·5	D	·50	·10	·5	N	·10	·5	·10	·5	·5	·5	·10	·5	D
111.12.01	N	·5	N	·5	D	·50	·10	·5	N	·10	·5	·10	7	·5	·5	·10	·5	7
526.22.00	N	·5	N	·5	D	·50	·10	·5	N	·10	·5	·10	·5	·5	·5	·10	·5	D
526.22.00	N	·5	N	·5	D	·50	·10	·5	N	·10	·5	·10	·5	·5	·5	·10	·5	D
526.22.00	N	·5	N	·5	D	·50	·10	·5	N	·10	·5	·10	·5	·5	·5	·10	·5	D

STATION	DEF	DIAZINON	DICHLO FENTHION	DICOFOL	DIELDRIN	DIPHENAMID	ENDO SULFAN I	ENDO SULFAN II	ENDO SULFAN SULFATE	TOTAL ENDO SULFAN	ENDRIN	ETHION	FENITRO THION	FENTHION
105.11.08	N	·125	·10	·100	·5	·600	·5	N	N	D	·15	·60	·12	N
105.11.08	N	·125	·10	·100	·5	·600	·5	N	N	D	·15	·60	·12	N
105.11.08	N	·125	·10	·100	·5	·600	·5	N	N	D	·15	·60	·12	N
106.12.03	N	·125	·10	·100	·5	·600	·5	N	N	D	·15	·60	·12	N
106.12.03	N	·125	·10	·100	·5	·600	·5	N	N	D	·15	·60	·12	N
111.12.01	N	·125	·10	·100	·5	·600	·5	N	N	D	·15	·60	·12	N
111.12.01	N	·125	·10	·100	·5	·600	·5	N	N	D	·15	·60	·12	N
111.12.01	N	·125	·10	·100	·5	·600	·5	N	N	D	·15	·60	·12	N
526.22.00	N	·125	·10	·100	·5	·600	·5	N	N	D	·15	·60	·12	N
526.22.00	N	·125	·10	·100	·5	·600	·5	N	N	D	·15	·60	·12	N
526.22.00	N	·125	·10	·100	·5	·600	·5	N	N	D	·15	·60	·12	N

STATION	FONOFOS	GUTHION	HCH ALPHA	HCH BETA	HCH DELTA	HCH GAMMA	HEPTACHLOR	HEPTA CHLOR EPOXIDE	HEXA CHLORO BENZENE	MALATHION	METHI DATHION	METH OXYCHLOR	MIREX	NOLINATE	NITROFEN
105.11.08	·10	·600	·2	·10	·2	·2	·5	·5	·2	N	N	·50	·40	N	·20
105.11.08	·10	·600	·2	·10	·2	·2	·5	·5	·2	N	N	·50	·40	N	·20
105.11.08	·10	·600	·2	·10	·2	·2	·5	·5	·2	N	N	·50	·40	N	·20
106.12.03	·10	·600	·2	·10	·2	·2	·5	·5	·2	N	N	·50	·40	N	·20
106.12.03	·10	·600	·2	·10	·2	·2	·5	·5	·2	N	N	·50	·40	N	·20
111.12.01	·10	·600	·2	·10	·2	·2	·5	·5	·2	N	N	·50	·40	N	·20
111.12.01	·10	·600	·2	·10	·2	·2	·5	·5	·2	N	N	·50	·40	N	·20
111.12.01	·10	·600	·2	·10	·2	·2	·5	·5	·2	N	N	·50	·40	N	·20
526.22.00	·10	·600	·2	·10	·2	·2	·5	·5	·2	N	N	·50	·40	N	·20
526.22.00	·10	·600	·2	·10	·2	·2	·5	·5	·2	N	N	·50	·40	N	·20
526.22.00	·10	·600	·2	·10	·2	·2	·5	·5	·2	N	N	·50	·40	N	·20

N = not analyzed. · = below indicated detection limit. D = below detection limit (no limit indicated).

1978 (continued)

STATION	CIS NONACHLOR	TRANS NONACHLOR	OMITE	ORGANO ARSENICALS	OXYCHLORDANE	PARATHION ETHYL	PARATHION METHYL	PCB 1242	PCB 1248	PCB 1254	PCB 1260	TOTAL PCB	PCNB	PENTA CHLOROPHENOL
105.11.08	N	-5	N	N	-5	-25	-25	N	N	N	N	N	-5	N
105.11.08	N	-5	N	N	-5	-25	-25	N	N	N	N	N	-5	N
105.11.08	N	-5	N	N	-5	-25	-25	N	N	N	N	N	-5	N
106.12.03	N	-5	N	N	-5	-25	-25	N	N	N	N	N	-5	N
106.12.03	N	-5	N	N	-5	-25	-25	N	N	N	N	N	-5	N
111.12.01	N	-5	N	N	-5	-25	-25	N	N	N	N	N	-5	N
111.12.01	N	-5	N	N	-5	-25	-25	N	N	N	N	N	-5	N
111.12.01	N	-5	N	N	-5	-25	-25	N	N	N	N	N	-5	N
526.22.00	N	-5	N	N	-5	-25	-25	N	N	N	N	N	-5	N
526.22.00	N	-5	N	N	-5	-25	-25	N	N	N	N	N	-5	N
526.22.00	N	-5	N	N	-5	-25	-25	N	N	N	N	N	-5	N

STATION	PERTHANE	PHENKAPTON	PHORATE	PRONAMIDE	RONNEL	SIMAZINE	STROBANE	TCE	TETRADIFON	TOXAPHENE	# PEAKS >5PPB @ 0% ETHYL ETHER
105.11.08	-500	-50	-100	N	-5	N	-200	N	-50	-400	N
105.11.08	-500	-50	-100	N	-5	N	-200	N	-50	-400	N
105.11.08	-500	-50	-100	N	-5	N	-200	N	-50	-400	N
106.12.03	-500	-50	-100	N	-5	N	-200	N	-50	-400	N
106.12.03	-500	-50	-100	N	-5	N	-200	N	-50	-400	N
111.12.01	-500	-50	-100	N	-5	N	-200	N	-50	-400	N
111.12.01	-500	-50	-100	N	-5	N	-200	N	-50	-400	N
111.12.01	-500	-50	-100	N	-5	N	-200	N	-50	-400	N
526.22.00	-500	-50	-100	N	-5	N	-200	N	-50	-400	N
526.22.00	-500	-50	-100	N	-5	N	-200	N	-50	-400	N
526.22.00	-500	-50	-100	N	-5	N	-200	N	-50	-400	N

STATION	# PEAKS >5PPB @ 6% ETHYL ETHER	# PEAKS >5PPB @ 15% ETHYL ETHER	2,4-D ACID	2,4-D ISOBUTYL ESTER	2,4-D N-BUTYL ESTER	2,4-D ISOPROPYL ESTER	TETRA CHLORO PHENOL	DICHLORO BENZO PHENONE P,P
105.11.08	N	N	N	-250	-200	-50	N	N
105.11.08	N	N	N	-250	-200	-50	N	N
105.11.08	N	N	N	-250	-200	-50	N	N
106.12.03	N	N	N	-250	-200	-50	N	N
106.12.03	N	N	N	-250	-200	-50	N	N
111.12.01	N	N	N	-250	-200	-50	N	N
111.12.01	N	N	N	-250	-200	-50	N	N
111.12.01	N	N	N	-250	-200	-50	N	N
526.22.00	N	N	N	-250	-200	-50	N	N
526.22.00	N	N	N	-250	-200	-50	N	N
526.22.00	N	N	N	-250	-200	-50	N	N

N = not analyzed. - = below indicated detection limit. D = below detection limit (no limit indicated).

1979 ORGANIC CHEMICALS IN FISH (ppb, wet weight)

STATION	STATION NAME	COMMON NAME	TISSUE TYPE	SAMPLE DATE	ALDRIN	ATRAZINE	BENEFIN	CARBARYL	CARBO PHENO THIONIN	CDEC	CHLOR BENSIDE
105.11.08	KLAMATH R / KLAM GLEN	FRESHWATER MUSSEL	WHOLE	79-08-25	.5	N	.5	N	.20	.15	.10
105.11.08	KLAMATH R / KLAM GLEN	SCULPIN	FLESH	79-08-25	.5	N	.5	N	.20	.15	.10
106.12.03	TRINITY R / WILLOW CK	FRESHWATER MUSSEL	WHOLE	79-08-28	.5	N	.5	N	.20	.15	.10
106.12.03	TRINITY R / WILLOW CK	RAINBOW TROUT	FLESH	79-08-28	.5	N	.5	N	.20	.15	.10
111.12.01	EEL R / SCOTIA	FRESHWATER MUSSEL	WHOLE	79-08-27	.5	N	.5	N	.20	.15	.10
111.12.01	EEL R / SCOTIA	SCULPIN	FLESH	79-08-27	.5	N	.5	N	.20	.15	.10
526.22.00	MCCLOUD R/SHASTA LAKE	BROWN TROUT	FLESH	79-08-23	.5	N	.5	N	.20	.15	.10

STATION	ALPHA CHLORDENE	CIS CHLORDANE	GAMMA CHLORDENE	TRANS CHLORDANE	TOTAL CHLORDANE	CHLORONEB	CHLOR PYRIFOS	DACTHAL	D-D	DDD O,P	DDD P,P	DDE O,P	DDE P,P	DDMS P,P	DDMU P,P	DDT O,P	DDT P,P	TOTAL DDT
105.11.08	N	.5	N	.5	D	.50	.10	.10	N	.5	.5	.5	.5	.5	.5	.5	.5	D
105.11.08	N	.5	N	.5	D	.50	.10	.10	N	.5	.5	.5	.5	.5	.5	.5	.5	D
106.12.03	N	.5	N	.5	D	.50	.10	.10	N	.5	.5	.5	.5	.5	.5	.5	.5	D
106.12.03	N	.5	N	.5	D	.50	.10	.10	N	.5	.5	.5	.5	.5	.5	.5	.5	D
111.12.01	N	.5	N	.5	D	.50	.10	.10	N	.5	.5	.5	.5	.5	.5	.5	.5	D
111.12.01	N	.5	N	.5	D	.50	.10	.10	N	.5	.5	.5	.5	.5	.5	.5	.5	D
526.22.00	N	.5	N	.5	D	.50	.10	.10	N	.5	.5	.5	.5	.5	.5	.5	.5	D

STATION	DEF	DIAZINON	DICHLO FENTHION	DICOFOL	DIELDRIN	DIPHENAMID	ENDO SULFAN I	ENDO SULFAN II	ENDO SULFAN SULFATE	TOTAL ENDO SULFAN	ENDRIN	ETHION	FENITRO THION	FENTHION
105.11.08	N	.125	.10	.100	.5	N	.10	N	N	D	.15	.60	.12	N
105.11.08	N	.125	.10	.100	.5	N	.10	N	N	D	.15	.60	.12	N
106.12.03	N	.125	.10	.100	.5	N	.10	N	N	D	.15	.60	.12	N
106.12.03	N	.125	.10	.100	.5	N	.10	N	N	D	.15	.60	.12	N
111.12.01	N	.125	.10	.100	.5	N	.10	N	N	D	.15	.60	.12	N
111.12.01	N	.125	.10	.100	.5	N	.10	N	N	D	.15	.60	.12	N
526.22.00	N	.125	.10	.100	.5	N	.10	N	N	D	.15	.60	.12	N

STATION	FONOFOS	GUTHION	HCH ALPHA	HCH BETA	HCH DELTA	HCH GAMMA	HEPTACHLOR	HEPTA CHLOR EPOXIDE	HEXA CHLORO BENZENE	MALATHION	METHI DATHION	METH OXYCHLOR	MIREX	MOLINATE	NITROFEN
105.11.08	.10	N	.2	.10	.2	.2	.5	.5	.5	N	N	.50	.40	N	.20
105.11.08	.10	N	.2	.10	.2	.2	.5	.5	.5	N	N	.50	.40	N	.20
106.12.03	.10	N	.2	.10	.2	.2	.5	.5	.5	N	N	.50	.40	N	.20
106.12.03	.10	N	.2	.10	.2	.2	.5	.5	.5	N	N	.50	.40	N	.20
111.12.01	.10	N	.2	.10	.2	.2	.5	.5	.5	N	N	.50	.40	N	.20
111.12.01	.10	N	.2	.10	.2	.2	.5	.5	.5	N	N	.50	.40	N	.20
526.22.00	.10	N	.2	.10	.2	.2	.5	.5	.5	N	N	.50	.40	N	.20

STATION	CIS NONACHLOR	TRANS NONACHLOR	OMITE	ORGANO ARSENICALS	OXYCHLORDANE	PARATHION ETHYL	PARATHION METHYL	PCB 1242	PCB 1248	PCB 1254	PCB 1260	TOTAL PCB	PCNB	PENTA CHLOROPHENOL
105.11.08	N	N	N	N	.10	.25	N	N	.50	.50	.50	D	.5	N
105.11.08	N	N	N	N	.10	.25	N	N	.50	.50	.50	D	.5	N
106.12.03	N	N	N	N	.10	.25	N	N	.50	.50	.50	D	.5	N
106.12.03	N	N	N	N	.10	.25	N	N	.50	.50	.50	D	.5	N
111.12.01	N	N	N	N	.10	.25	N	N	.50	.50	.50	D	.5	N
111.12.01	N	N	N	N	.10	.25	N	N	.50	.50	.50	D	.5	N
526.22.00	N	N	N	N	.10	.25	N	N	.50	.50	.50	D	.5	N

N = not analyzed. . = below indicated detection limit. D = below detection limit (no limit indicated).

1979 (continued)

STATION	PERTHANE	PHENKAPTON	PHORATE	PRONAMIDE	RONNEL	SIMAZINE	STROBANE	TCE	TETRADIFON	TOXAPHENE	# PEAKS >5PPB @ 0% ETHYL ETHER
105.11.08	·500	·50	·100	N	·5	N	·200	N	·50	·250	N
105.11.08	·500	·50	·100	N	·5	N	·200	N	·50	·250	N
106.12.03	·500	·50	·100	N	·5	N	·200	N	·50	·250	N
106.12.03	·500	·50	·100	N	·5	N	·200	N	·50	·250	N
111.12.01	·500	·50	·100	N	·5	N	·200	N	·50	·250	N
111.12.01	·500	·50	·100	N	·5	N	·200	N	·50	·250	N
526.22.00	·500	·50	·100	N	·5	N	·200	N	·50	·250	N

STATION	# PEAKS >5PPB @ 6% ETHYL ETHER	# PEAKS >5PPB @ 15% ETHYL ETHER	2,4-D ACID	2,4-D ISOBUTYL ESTER	2,4-D N-BUTYL ESTER	2,4-D ISOPROPYL ESTER	TETRA CHLORO PHENOL	DICHLORO BENZO PHENONE P,P
105.11.08	N	N	N	·250	·200	·50	N	N
105.11.08	N	N	N	·250	·200	·50	N	N
106.12.03	N	N	N	·250	·200	·50	N	N
106.12.03	N	N	N	·250	·200	·50	N	N
111.12.01	N	N	N	·250	·200	·50	N	N
111.12.01	N	N	N	·250	·200	·50	N	N
526.22.00	N	N	N	·250	·200	·50	N	N

N = not analyzed. · = below indicated detection limit. D = below detection limit (no limit indicated).

1980 ORGANIC CHEMICALS IN FISH (ppb, wet weight)

STATION	STATION NAME	COMMON NAME	TISSUE TYPE	SAMPLE DATE	ALDRIN	ATRAZINE	BENEFIN	CARBARYL	CARBO PHENO THIONIN	CDEC	CHLOR BENSIDE
103.11.12	SMITH R/JEDEDIAH SMITH REDWOOD	CRAYFISH	WHOLE	80-10-18	-5	N	-5	N	-20	-5	-5
103.11.12	SMITH R/JEDEDIAH SMITH REDWOOD	SCULPIN	FLESH	80-10-18	-5	N	-5	N	-20	-5	-5
105.38.03	KLAMATH R / COPCO RESERVOIR	YELLOW PERCH	FLESH	80-10-20	-5	N	-5	N	-20	-5	-5
519.10.07	RECLAMATION SLOUGH *	CHANNEL CATFISH	FLESH	80-10-23	-5	N	-5	N	-20	-5	-5
519.10.07	RECLAMATION SLOUGH *	BROWN BULLHEAD	FLESH	80-10-23	-5	N	-5	N	-20	-5	-5
520.11.36	COLUSA DRAIN/ABEL ROAD	BROWN BULLHEAD	FLESH	80-10-23	-5	N	-5	N	-20	-5	-5
520.11.36	COLUSA DRAIN/ABEL ROAD	BROWN BULLHEAD	FLESH	80-10-23	-5	N	-5	N	-20	-5	-5
524.47.15	SACRAMENTO R / KESWICK	RAINBOW TROUT	FLESH	80-10-08	N	N	N	N	N	N	N
524.47.15	SACRAMENTO R / KESWICK	RAINBOW TROUT	FLESH	80-10-09	-5	N	-5	N	-20	-5	-5
526.14.00	PIT R/PIT 7 POWERHOUSE	RAINBOW TROUT	FLESH	80-10-23	-5	N	-5	N	-20	-5	-5

STATION	ALPHA CHLORDENE	CIS CHLORDANE	GAMMA CHLORDENE	TRANS CHLORDANE	TOTAL CHLORDANE	CHLOR PYRIFOS	DACTHAL	D-D	DDD O,P	DDD P,P	DDE O,P	DDE P,P	DDMS P,P	DDMU P,P	DDT O,P	DDT P,P	TOTAL DDT
103.11.12	N	-5	N	-5	D	-30	-10	-5	N	-10	-10	-10	-5	-30	-15	-10	-10	D
103.11.12	N	-5	N	-5	D	-30	-10	-5	N	-10	-10	-10	-5	-30	-15	-10	-10	D
105.38.03	N	-5	N	-5	D	-30	-10	-5	N	-10	-10	-10	-5	-30	-15	-10	-10	D
519.10.07	N	-5	N	-5	8	-30	-10	-5	N	-10	71	-10	350	-30	16	-10	-10	437
519.10.07	N	12	N	5	49	-30	-10	-5	N	31	310	14	920	32	51	-10	-10	1358
520.11.36	N	10	N	7	36	-30	-10	21	N	-10	76	-10	350	-30	22	-10	-10	448
520.11.36	N	-5	N	-5	12	-30	-10	36	N	-10	73	-10	550	-30	-15	-10	-10	623
524.47.15	N	N	N	N	N	N	N	N	N	N	N	N	25	N	N	N	N	25
524.47.15	N	-5	N	-5	D	-30	-10	-5	N	-10	-10	-10	25	-30	-15	-10	-10	25
526.14.00	N	-5	N	-5	D	-30	-10	-5	N	-10	-10	-10	56	-30	-15	-10	-10	56

STATION	DEF	DIAZINON	DICHLO FENTHION	DICOFOL	DIELDRIN	DIPHENAMID	ENDO SULFAN I	ENDO SULFAN II	ENDO SULFAN SULFATE	TOTAL ENDO SULFAN	ENDRIN	ETHION	FENITRO THION	FENTHION
103.11.12	N	-50	-10	-100	-5	N	-5	N	N	D	-15	-20	-10	N
103.11.12	N	-50	-10	-100	-5	N	-5	N	N	D	-15	-20	-10	N
105.38.03	N	-50	-10	-100	-5	N	-5	N	N	D	-15	-20	-10	N
519.10.07	N	-50	-10	-100	7	N	-5	N	N	D	-15	-20	-10	N
519.10.07	N	-50	-10	-100	40	N	22	N	N	22	-15	-20	-10	N
520.11.36	N	-50	-10	-100	8	N	-5	N	N	D	-15	-20	-10	N
520.11.36	N	-50	-10	-100	-5	N	-5	N	N	D	-15	-20	-10	N
524.47.15	N	N	N	N	N	N	N	N	N	N	N	N	N	N
524.47.15	N	-50	-10	-100	-5	N	-5	N	N	D	-15	-20	-10	N
526.14.00	N	-50	-10	-100	-5	N	-5	N	N	D	-15	-20	-10	N

STATION	FONOFOS	GUTHION	HCH ALPHA	HCH BETA	HCH DELTA	HCH GAMMA	HEPTACHLOR	HEPTA CHLOR EPOXIDE	HEXA CHLORO BENZENE	MALATHION	METHI DATHION	METH OXYCHLOR	MIREX	MOLINATE	NITROFEN
103.11.12	-5	N	-2	-20	-2	-2	-5	-5	-2	N	N	-30	-20	N	-10
103.11.12	-5	N	-2	-20	-2	-2	-5	-5	-2	N	N	-30	-20	N	-10
105.38.03	-5	N	-2	-20	-2	-2	-5	-5	-2	N	N	-30	-20	N	-10
519.10.07	-5	N	-2	-20	-2.0	-2	-5	-5	-2	N	N	-30	-20	N	-10
519.10.07	-5	N	-2	-20	-2.0	-2	-5	-5	3	N	N	-30	-20	N	-10
520.11.36	-5	N	-2	-20	-2.0	-2	-5	-5	-2	N	N	-30	-20	N	-10
520.11.36	-5	N	-2	-20	-2.0	-2	-5	-5	-2	N	N	-30	-20	N	-10
524.47.15	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
524.47.15	-5	N	-2	-20	-2.0	-2	-5	-5	-2	N	N	-30	-20	N	-10
526.14.00	-5	N	-2	-20	-2.0	-2	-5	-5	-2	N	N	-30	-20	N	-10

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* NOT WITHIN NORTHERN DISTRICT BUT WITHIN THE MONITORING AREA

1980 (continued)

STATION	CIS NONACHLOR	TRANS NONACHLOR	OHITE ORGANO ARSENICALS	OXYCHLORDANE	PARATHION ETHYL	PARATHION METHYL	PCB 1242	PCB 1248	PCB 1254	PCB 1260	TOTAL PCB	PCNB	PENTA CHLOROPHENOL
103.11.12	N	-5	N	-5	-10	-10	-50	-50	-50	-50	D	-5	N
103.11.12	N	-5	N	-5	-10	-10	-50	-50	-50	-50	D	-5	N
105.38.03	N	-5	N	-5	-10	-10	-50	-50	-50	-50	D	-5	N
519.10.07 *	N	8	N	-5	-10	-10	-50	-50	-50	180	180	-5	N
519.10.07 *	N	32	N	-5	-10	-10	-50	-50	-50	350	350	-5	N
520.11.36	N	19	N	-5	-10	-10	-50	-50	-50	350	350	-5	N
520.11.36	N	12	N	-5	-10	-10	-50	-50	-50	330	330	-5	N
524.47.15	N	N	N	N	N	N	N	N	N	N	N	N	N
524.47.15	N	-5	N	-5	-10	-10	-50	-50	-50	-50	D	-5	N
526.14.00	N	-5	N	-5	-10	-10	-50	-50	-50	-50	D	-5	N

STATION	PERTHANE	PHENKAPTON	PHORATE	PRONAMIDE	RONNEL	SIMAZINE	STROBANE	TCE	TETRADIFON	TOXAPHENE	# PEAKS >5PPB @ 0% ETHYL ETHER
103.11.12	-150	-25	-60	N	-5	N	-200	N	-20	-100	N
103.11.12	-150	-25	-60	N	-5	N	-200	N	-20	-100	N
105.38.03	-150	-25	-60	N	-5	N	-200	N	-20	-100	N
519.10.07	-150	-25	-60	N	-5	N	-200	N	-20	300	N
519.10.07	-150	-25	-60	N	-5	N	-200	N	-20	400	N
520.11.36	-150	-25	-60	N	-5	N	-200	N	-20	200	N
520.11.36	-150	-25	-60	N	-5	N	-200	N	-20	100	N
524.47.15	N	N	N	N	N	N	N	N	N	N	N
524.47.15	-150	-25	-60	N	-5	N	-200	N	-20	-100	N
526.14.00	-150	-25	-60	N	-5	N	-200	N	-20	-100	N

STATION	# PEAKS >5PPB @ 6% ETHYL ETHER	# PEAKS >5PPB @ 15% ETHYL ETHER	2,4-D ACID	2,4-D ISOBUTYL ESTER	2,4-D N-BUTYL ESTER	2,4-D ISOPROPYL ESTER	TETRA CHLORO PHENOL	DICHLORO BENZO PHENONE P,P
103.11.12	N	N	N	-100	-100	-100	N	N
103.11.12	N	N	N	-100	-100	-100	N	N
105.38.03	N	N	N	-100	-100	-100	N	N
519.10.07	N	N	N	-100	-100	-100	N	N
519.10.07	N	N	N	-100	-100	-100	N	N
520.11.36	N	N	N	-100	-100	-100	N	N
520.11.36	N	N	N	-100	-100	-100	N	N
524.47.15	N	N	N	N	N	N	N	N
524.47.15	N	N	N	-100	-100	-100	N	N
526.14.00	N	N	N	-100	-100	-100	N	N

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* NOT WITHIN NORTHERN DISTRICT BUT WITHIN THE MONITORING AREA

1981 ORGANIC CHEMICALS IN FISH (ppb, wet weight)

STATION	STATION NAME	COMMON NAME	TISSUE TYPE	SAMPLE DATE	ALDRIN	ATRAZINE	BENEFIN	CARBARYL	CARBO PHENO THIONIN	CDEC	CHLORBENSIDE
105.11.08	KLAMATH R / KLAM GLEN	SCULPIN	FLESH	81-09-14	-5	-50	-5	-200	-20	-5	-5
106.12.03	TRINITY R / WILLOW CK	RAINBOW TROUT	FLESH	81-09-13	N	N	N	N	N	N	N
109.10.10	HAD RIVER	SCULPIN	FLESH	81-09-14	-5	-50	-5	-200	-20	-5	-5
111.12.01	EEL R / SCOTIA	SCULPIN	FLESH	81-09-16	-5	-50	-5	-200	-20	-5	-5
111.63.14	LAKE PILLSBURY	GREEN SUNFISH	FLESH	81-09-17	N	N	N	N	N	N	N
513.52.16	CLEAR LAKE/RATTLESNAKE ISLE	LARGEMOUTH BASS	FLESH	81-08-11	-5	-50	-5	-200	-20	-5	-5
519.10.06	SUTTER BYPASS *	CARP	FLESH	81-07-16	-5	-50	-5	-200	-20	-5	-5
519.10.06	SUTTER BYPASS *	CHANNEL CATFISH	FLESH	81-07-16	-5	-50	-5	-200	-20	-5	-5
519.10.07	RECLAMATION SLOUGH *	CHANNEL CATFISH	FLESH	81-07-16	-5	-50	-5	-200	-20	-5	-5
520.11.03	COLUSA DRAIN/KNIGHTS LANDING *	CHANNEL CATFISH	FLESH	81-07-23	-5	-50	-5	-200	-20	-5	-5
520.11.03	COLUSA DRAIN/KNIGHTS LANDING *	SUCKER	FLESH	81-07-23	-5	-50	-5	-200	-20	-5	-5
520.11.36	COLUSA DRAIN/ABEL ROAD	CHANNEL CATFISH	FLESH	81-07-23	-5	-50	-5	-200	-20	-5	-5
520.11.36	COLUSA DRAIN/ABEL ROAD	CARP	FLESH	81-07-23	-5	-50	-5	-200	-20	-5	-5
523.12.10	SACRAMENTO R/HAMILTON CITY	HARDHEAD	FLESH	81-07-30	-5	-50	-5	-200	-20	-5	-5
524.47.15	SACRAMENTO R / KESWICK	RAINBOW TROUT	FLESH	81-07-15	-5	-50	-5	-200	-20	-5	-5
525.11.01	SHASTA L/SQUAW CREEK ARM	LARGEMOUTH BASS	FLESH	81-09-10	-5	-50	-5	-200	-20	-5	-5
637.20.22	SUSAN R / SUSANVILLE	SUCKER	FLESH	81-07-28	-5	-50	-5	-200	-20	-5	-5

STATION	ALPHA CHLORDENE	CIS CHLORDANE	GAMMA CHLORDENE	TRANS CHLORDANE	TOTAL CHLORDANE	CHLORONEB	CHLOR PYRIFOS	DACTHAL	D-D	DDD O,P	DDD P,P	DDE O,P	DDE P,P	DDMS P,P	DDMU P,P	DDT O,P	DDT P,P	TOTAL DDT
105.11.08	-2	-5	-2	-5	D	-30	-10	-5	N	-10	-10	-10	-5	-30	-15	-10	-10	D
106.12.03	-2	N	-2	N	D	N	N	N	N	N	N	N	N	N	N	N	N	N
109.10.10	-2	-5	-2	-5	D	-30	-10	-5	N	-10	7	-10	-5	-30	-15	-10	28	35
111.12.01	-2	-5	-2	-5	D	-30	-10	-5	N	-10	-10	-10	-5	-30	-15	-10	-10	D
111.63.14	-2	N	-2	N	D	N	N	N	N	N	N	N	N	N	N	N	N	N
513.52.16	N	-5	N	-5	D	-30	-10	-5	N	-10	19	-10	7	-30	-15	-10	-10	26
519.10.06	-2	-5	-2	-5	D	-30	-10	-5	N	-10	13	-10	66	-30	-15	-10	-10	79
519.10.06	-2	8	-2	-5	19	-30	-10	-5	N	-10	47	-10	130	-30	-15	-10	-10	177
519.10.07	-2	-5	-2	-5	D	-30	-10	-5	N	-10	22	-10	86	-30	-15	-10	-10	108
520.11.03	-2	5	-2	-5	13	-30	-10	8	N	-10	50	-10	160	-30	-15	-10	-10	210
520.11.03	-2	-5	-2	-5	D	-30	-10	-5	N	-10	-10	-10	39	-30	-15	D	-10	39
520.11.36	-2	5	-2	-5	12	-30	-10	6	N	10	53	-10	170	-30	-15	-10	32	265
520.11.36	-2	-5	-2	-5	D	-30	-10	-5	N	11	44	-10	110	-30	-15	-10	-10	165
523.12.10	-2	-5	-2	-5	5	-30	-10	-5	N	-10	-10	-10	69	-30	-15	-10	-10	69
524.47.15	-2	-5	-2	-5	D	-30	-10	-5	N	-10	-10	-10	9	-30	-15	-10	-10	9
525.11.01	-2	-5	-2	-5	D	-30	-10	-5	N	-10	-10	-10	-5	-30	-15	-10	-10	D
637.20.22	-2	-5.0	-2	-5.0	D	-30	-10	-5.0	N	-10	-10	-10	7	-30	-15	-10	-10	7

STATION	DEF	DIAZINON	DICHLO FENTHION	DICOFOL	DIELDRIN	DIPHENAMID	ENDO SULFAN I	ENDO SULFAN II	ENDO SULFAN SULFATE	TOTAL ENDO SULFAN	ENDRIN	ETHION	FENITRO THION	FENTHION
105.11.08	-100	-50	-10	-100	-5	-50	-5	N	N	D	-15	-20	-10	N
106.12.03	N	N	N	N	N	N	N	N	N	N	N	N	N	N
109.10.10	-100	-50	-10	-100	-5	-50	-5	N	N	D	-15	-20	-10	N
111.12.01	-100	-50	-10	-100	-5	-50	-5	N	N	D	-15	-20	-10	-20
111.63.14	N	N	N	N	N	N	N	N	N	N	N	N	N	N
513.52.16	-100	-50	-10	-100	-5	-50	-5	N	N	D	-15	-20	-10	N
519.10.06	-100	-50	-10	-100	5	-50	16	N	N	16	-15	-20	-10	-20
519.10.06	-100	-50	-10	-100	6	-50	22	N	N	22	-15	-20	-10	-20
519.10.07	-100	-50	-10	-100	5	-50	-5	N	N	D	-15	-20	-10	-20
520.11.03	-100	-50	-10	-100	8	-50	11	N	N	11	-15	-20	-10	-20
520.11.03	-100	-50	-10	-100	-5	-50	-5	N	N	D	-15	-20	-10	-20
520.11.36	-100	-50	-10	-100	7	-50	-5	N	N	D	-15	-20	-10	-20
520.11.36	-100	-50	-10	-100	13	-50	-5	N	N	D	-15	-20	-10	-20
523.12.10	-100	-50	-10	-100	-5	-50	-5	N	N	D	-15	-20	-10	-20
524.47.15	-100	-50	-10	-100	-5	-50	-5	N	N	D	-15	-20	-10	N
525.11.01	-100	-50	-10	-100	-5	-50	-5	N	N	D	-15	-20	-10	N
637.20.22	-100	-50	-10	-100	6	-50	-5	N	N	D	-15	-20	-10	N

N = not analyzed. - = below indicated detection limit. D = below detection limit (no limit indicated).

* NOT WITHIN NORTHERN DISTRICT BUT WITHIN THE MONITORING AREA

1981 (continued)

STATION	FONOFOS	GUTHION	HCH ALPHA	HCH BETA	HCH DELTA	HCH GAMMA	HEPTACHLOR	HEPTA CHLOR EPOXIDE	HEXA CHLORO BENZENE	MALATHION	METHA DITHION	METH OXYCHLOR	MIREX	MOLINATE	NITROFEN
105.11.08	·5	·50	·2	·10	·2	·2	·5	·5	·2	·100	·50	·30	·20	N	·10
106.12.03	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
109.10.10	·5	·50	·2	·10	·2	·2	·5	·5	·2	·100	·50	·30	·20	N	·10
111.12.01	·5	·50	·2	·10	·2	·2	·5	·5	·2	·100	·50	·30	·20	N	·10
111.63.14	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
513.52.16	·5	·50	·2	·10	·2	·2	·5	·5	·2	·100	·50	·30	·20	N	·10
519.10.06*	·5	·50	·2	·10	·2	·2	·5	·5	·2	·100	·50	·30	·20	N	·10
519.10.06*	·5	·50	·2	·10	·2	·2	·5	·5	·2	·100	·50	·30	·20	N	·10
519.10.07*	·5	·50	·2	·10	·2	·2	·5	·5	·2	·100	·50	·30	·20	N	·10
520.11.03*	·5	·50	·2	·10	·2	·2	·5	·5	·2	·100	·50	·30	·20	N	·10
520.11.03*	·5	·50	·2	·10	·2	·2	·5	·5	·2	·100	·50	·30	·20	N	·10
520.11.36	·5	·50	·2	·10	·2	·2	·5	·5	·2	·100	·50	·30	·20	N	·10
520.11.36	·5	·50	·2	·10	·2	·2	·5	·5	·2	·100	·50	·30	·20	N	·10
523.12.10	·5	·50	·2	·10	·2	·2	·5	·5	·2	·100	·50	·30	·20	N	·10
524.47.15	·5	·50	·2	·10	·2	·2	·5	·5	·2	·100	·50	·30	·20	N	·10
525.11.01	·5	·50	·2	·10	·2	·2	·5	·5	·2	·100	·50	·30	·20	N	·10
637.20.22	·5	·50	·2	·10	·2	·2	·5	·5	·2	·100	·50	·30	·20	N	·10

STATION	CIS NONACHLOR	TRANS NONACHLOR	OMITE	ORGANO ARSENICALS	OXYCHLORDANE	PARATHION ETHYL	PARATHION METHYL	PCB 1242	PCB 1248	PCB 1254	PCB 1260	TOTAL PCB	PCNB	PENTA CHLOROPHENOL
105.11.08	·30	·5	N	N	·5	·10	·10	·50	·50	·50	·50	D	·5	N
106.12.03	·30	N	N	N	N	N	N	N	N	N	N	N	N	N
109.10.10	·30	·5	N	N	·5	·10	·10	·50	·50	·50	·50	D	·5	N
111.12.01	·30	·5	N	N	·5	·10	·10	·50	·50	·50	·50	D	·5	N
111.63.14	·30	N	N	N	N	N	N	N	N	N	N	N	N	N
513.52.16	N	·5	N	N	·5	·10	·10	·50	·50	·50	·50	D	·5	N
519.10.06	·30	·5	N	N	·5	·10	·10	·50	·50	·50	·50	D	·5	N
519.10.06	·30	11	N	N	·5	·10	·10	·50	·50	·50	·50	D	·5	N
519.10.07	·30	·5	N	N	·5	·10	·10	·50	·50	·50	·50	D	·5	N
520.11.03	·30	8	N	N	·5	·10	·10	·50	·50	·50	·50	D	·5	N
520.11.03	·30	·5	N	N	·5	·10	·10	·50	·50	·50	·50	D	·5	N
520.11.36	·30	7	N	N	·5	·10	·10	·50	·50	·50	·50	D	·5	N
520.11.36	·30	·5	N	N	·5	·10	·10	·50	·50	·50	·50	D	·5	N
523.12.10	·30	5	N	N	·5	·10	·10	·50	·50	·50	·50	D	·5	N
637.20.22	·30	·5	N	N	·5	·10	·10	·50	·50	·50	·50	D	·5	N

STATION	PERTHANE	PHENKAPTON	PHORATE	PRONAMIDE	RONNEL	SIMAZINE	STIROBANE	TCE	TETRADIFON	TOXAPHENE	# PEAKS>5PPB @ DX ETHYL ETHER
105.11.08	·150	·25	·60	·50	·5	N	·200	N	·20	·100	N
106.12.03	N	N	N	N	N	N	N	N	N	N	N
109.10.10	·150	·25	·60	·50	·5	N	·200	N	·20	·100	N
111.12.01	·150	·25	·60	·50	·5	·20	·200	N	·20	·100	N
111.63.14	N	N	N	N	N	N	N	N	N	N	N
513.52.16	·150	·25	·60	·50	·5	N	·200	N	·20	·100	N
519.10.06	·150	·25	·60	·50	·5	·20	·200	N	·20	·100	N
519.10.06	·150	·25	·60	·50	·5	·20	·200	N	·20	250	N
519.10.07	·150	·25	·60	·50	·5	·20	·200	N	·20	·100	N
520.11.03	·150	·25	·60	·50	·5	·20	·200	N	·20	·100	N
520.11.03	·150	·25	·60	·50	·5	·20	·200	N	·20	·100	N
520.11.36	·150	·25	·60	·50	·5	·20	·200	N	·20	·100	N
520.11.36	·150	·25	·60	·50	·5	·20	·200	N	·20	·100	N
523.12.10	·150	·25	·60	·50	·5	·20	·200	N	·20	·100	N
637.20.22	·150	·25	·60	·50	·5	N	·200	N	·20	·100	N

N = not analyzed. · = below indicated detection limit. D = below detection limit (no limit indicated).

* NOT WITHIN NORTHERN DISTRICT BUT WITHIN THE MONITORING AREA

1981 (continued)

STATION	# PEAKS >5PPB @ 6% ETHYL ETHER	# PEAKS >5PPB @ 15% ETHYL ETHER	2,4-D ACID	2,4-D ISOBUTYL ESTER	2,4-D N-BUTYL ESTER	2,4-D ISOPROPYL ESTER	TETRA CHLORO' PHENOL	DICHLORO BENZO PHENONE P,P
105.11.00	N	N	N	-100	-100	-100	N	N
106.12.03	N	N	N	N	N	N	N	N
109.10.10	N	N	N	-100	-100	-100	N	N
111.12.01	N	N	N	-100	-100	-100	N	N
111.63.14	N	N	N	N	N	N	N	N
513.52.16	N	N	N	-100	-100	-100	N	N
519.10.06 ✳	N	N	N	-100	-100	-100	N	N
519.10.06 ✳	N	N	N	-100	-100	-100	N	N
519.10.07 ✳	N	N	N	-100	-100	-100	N	N
520.11.03 ✳	N	N	N	-100	-100	-100	N	N
520.11.03 ✳	N	N	N	-100	-100	-100	N	N
520.11.36	N	N	N	-100	-100	-100	N	N
520.11.36	N	N	N	-100	-100	-100	N	N
523.12.10	N	N	N	-100	-100	-100	N	N
637.20.22	N	N	N	-100	-100	-100	N	N

N = not analyzed. - = below indicated detection limit. 0 = below detection limit (no limit indicated).

✳ NOT WITHIN NORTHERN DISTRICT BUT WITHIN THE MONITORING AREA

1982 ORGANIC CHEMICALS IN FISH (ppb, wet weight)

STATION	STATION NAME	COMMON NAME	TISSUE TYPE	SAMPLE DATE	ALDRIN	ATRAZINE	BENEFIN	CARBARYL	CARBO PHENO THIONIN	CDEC	CHLORBENSIDE
519.10.06	SUTTER BYPASS *	WHITE CATFISH	FLESH	82-07-22	-5	-20	-5	-40	-20	-5	-5
519.10.07	RECLAMATION SLOUGH *	WHITE CATFISH	FLESH	82-07-22	-5	-20	-5	-40	-20	-5	-5

STATION	ALPHA CHLORDENE	CIS CHLORDANE	GAMMA CHLORDENE	TRANS CHLORDANE	TOTAL CHLORDANE	CHLORONEB	CHLOR PYRIFOS	DACTHAL	D-D	DDD O,P	DDD P,P	DDE O,P	DDE P,P	DDMS P,P	DDMU P,P	DDT O,P	DDT P,P	TOTAL DDT
519.10.06	-5	5.0	-5	-5.0	17.0	-30	-10	-5	N	-10	34	-10	280	-30	-15	-10	-10	314
519.10.07	-5	-5	-5	-5.0	D	-30	-10	-5	N	-10	11	-10	52	-30	-15	-10	-10	63

STATION	DEF	DIAZINON	DICHLO FENTHION	DICOFOL	DIELDRIN	DIPHENAMID	ENDO SULFAN I	ENDO SULFAN II	ENDO SULFAN SULFATE	TOTAL ENDO SULFAN	ENDRIN	ETHION	FENITRO THION	FENTHION
519.10.06	-300	-50	-10	-100	-5	-20	-5	N	N	D	-15	-20	-10	-300
519.10.07	-300	-50	-10	-100	-5	-20	-5	N	N	D	-15	-20	-10	-300

STATION	FONOFOS	GUTHION	HCH ALPHA	HCH BETA	HCH DELTA	HCH GAMMA	HEPTACHLOR	HEPTA CHLOR EPOXIDE	HEXA CHLORO BENZENE	MALATHION	META DITHION	METH OXYCHLOR	MIREX	MOLINATE	NITROFEN
519.10.06	-5	-20	-2.0	-10	-2	-2	-5	-5	-2.0	-100	-300	-30	-20	N	-10
519.10.07	-5	-20	-2	-10	-2	-2	-5	-5	-2.0	-100	-300	-30	-20	N	-10

STATION	CIS NONACHLOR	TRANS NONACHLOR	ONITE ORGANO ARSENICALS	OXYCHLORDANE	PARATHION ETHYL	PARATHION METHYL	PCB 1242	PCB 1248	PCB 1254	PCB 1260	TOTAL PCB	PCNB	PENTA CHLOROPHENOL
519.10.06	-5	12.0	N	-5.0	-10	-10	-50	-50	-50	110	110	-5	N
519.10.07	-5	-5.0	N	-5	-10	-10	-50	-50	-50	-50	D	-5	N

STATION	PERTHANE	PHENKAPTON	PHORATE	PRONAMIDE	RONNEL	SIMAZINE	STIROBANE	TCE	TETRADIFON	TOXAPHENE	# PEAKS>5PPB @ 0% ETHYL ETHER
519.10.06	-150	-25	-60	-20	-5	N	-200	N	-20	-100	1
519.10.07	-150	-25	-60	-20	-5	N	-200	N	-20	-100	0

STATION	# PEAKS >5PPB @ 6% ETHYL ETHER	# PEAKS >5PPB @ 15% ETHYL ETHER	2,4-D ACID	2,4-D ISOBUTYL ESTER	2,4-D N-BUTYL ESTER	2,4-D ISOPROPYL ESTER	TETRA CHLORO PHENOL	DICHLORO BENZO PHENONE P,P
519.10.06	0	0	N	-100	-100	-100	N	N
519.10.07	0	0	N	-100	-100	-100	N	N

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* NOT WITHIN NORTHERN DISTRICT BUT WITHIN THE MONITORING AREA

1983 ORGANIC CHEMICALS IN FISH (ppb, wet weight)

STATION	STATION NAME	COMMON NAME	TISSUE TYPE	SAMPLE DATE	ALDRIN	AIRAZINE	BENEFIN	CARBARYL	CARBO PHENO THIONIN	CDEC
105.32.00	INDIAN CREEK	STEELHEAD RAINBOW TROUT	FLESH	83-09-22	N	N	N	N	N	N
519.10.06	SUTTER BYPASS *	CHANNEL CATFISH	FLESH	83-08-10	-5	N	-5	N	-20	-5
519.10.06	SUTTER BYPASS *	WHITE CATFISH	FLESH	83-08-10	-5	N	-5	N	-20	-5
637.20.22	SUSAN R / SUSANVILLE	SUCKER	FLESH	83-10-13	-5	N	-5	N	-20	-5

STATION	CHLOR BENSIDE	ALPHA CHLORDENE	CIS CHLORDANE	GAMMA CHLORDENE	TRANS CHLORDANE	TOTAL CHLORDANE	CHLORONEB	CHLOR PYRIFOS	DACTHAL	D-D	DDD O,P	DDD P,P	DDE O,P	DDE P,P	DDMS P,P	DDMU P,P	DDT O,P
105.32.00	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
519.10.06	-5	-5.0	8.4	-5	-5.0	20.4	-30	-10	-5	N	14	120	-10	520.0	-30	18	12
519.10.06	-5	-5.0	-5.0	-5	-5.0	6.3	-30	-10	-5	N	-10	32	-10	190.0	-30	-15	-10
637.20.22	-5	-5.0	-5.0	-5	-5.0	D	-30	-10	-5	N	-10	-10	-10	-5.0	-30	-15	-10

STATION	DDT P,P	TOTAL DDT	DEF	DIAZINON	DICHLO FENTHION	DICOFOL	DIELDRIN	DIPHENAMID	ENDO SULFAN I	ENDO SULFAN II	ENDO SULFAN SULFATE	TOTAL ENDO SULFAN	ENDRIN	ETHION	FENITRO THION
105.32.00	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
519.10.06	100	784.0	N	-50	-10	-100	-5.0	N	8.3	-10	-15	8.3	-15	-20	-10
519.10.06	-10	222.0	N	-50	-10	-100	-5.0	N	-5.0	N	N	D	-15	-20	-10
637.20.22	-10	D	N	-50	-10	-100	-5.0	N	-5.0	N	N	D	-15	-20	-10

STATION	FENTHION	FONOFOS	GUTHION	HCH ALPHA	HCH BETA	HCH DELTA	HCH GAMMA	HEPTACHLOR	HEPTA CHLOR EPOXIDE	HEXA CHLORO BENZENE	MALATHION	METHI DATHION	METH OXYCHLOR	MIREX	MOLINATE
105.32.00	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
519.10.06	N	-5	N	-2.0	-10	-2.0	-2.0	-5	-5	-2.0	N	N	-30	-20	N
519.10.06	N	-5	N	-2.0	-10	-2.0	-2.0	-5	-5	-2.0	N	N	-30	-20	N
637.20.22	N	-5	N	-2.0	-10	-2.0	-2.0	-5	-5	-2.0	N	N	-30	-20	N

STATION	NITROFEN	CIS NONACHLOR	TRANS NONACHLOR	OMITE	ORGANO ARSENICALS	OXYCHLORDANE	PARATHION ETHYL	PARATHION METHYL	PCB 1242	PCB 1248	PCB 1254	PCB 1260	TOTAL PCB	PCNB
105.32.00	N	N	N	N	N	N	N	N	N	N	N	N	N	N
519.10.06	-10	-5	12.0	N	N	-5	-10	-10	-50	-50	64	-50	64	-5
519.10.06	-10	-5	6.3	N	N	-5	-10	-10	-50	-50	-50	-50	D	-5
637.20.22	-10	-5	-5.0	N	N	-5	-10	-10	-50	-50	-50	-50	D	-5

STATION	PENTA CHLOROPHENOL	PERTHANE	PHENKAPTON	PHORATE	PRONAMIDE	RONNEL	SIMAZINE	STIROBANE	TCE	TETRADIFON	TOXAPHENE	# PEAKS>5PPB @ 0% ETHYL ETHER
105.32.00	N	N	N	N	N	N	N	N	N	N	N	N
519.10.06	N	-150	-25	-60	N	-5	N	-200	N	-20	890	N
519.10.06	N	-150	-25	-60	N	-5	N	-200	N	-20	-100	N
637.20.22	N	-150	-25	-60	N	-5	N	-200	N	-20	-100	N

STATION	# PEAKS >5PPB @ 6% ETHYL ETHER	# PEAKS >5PPB @ 15% ETHYL ETHER	2,4-D ACID	2,4-D ISOBUTYL ESTER	2,4-D N-BUTYL ESTER	2,4-D ISOPROPYL ESTER	TETRA CHLORO PHENOL	DICHLORO BENZO PHENONE P,P
105.32.00	N	N	-400	N	N	N	N	N
519.10.06	N	N	N	-100	-100	-100	N	N
519.10.06	N	N	N	-100	-100	-100	N	N
637.20.22	N	N	N	-100	-100	-100	N	N

N = not analyzed. - = below indicated detection limit. D = below detection limit (no limit indicated).

* NOT WITHIN NORTHERN DISTRICT BUT WITHIN THE MONITORING AREA

1983 ORGANIC CHEMICALS IN SOIL, SEDIMENT OR WATER SAMPLES (ppb, wet weight)

STATION NUMBER	STATION NAME	TYPE	SAMPLE DATE	CHLOR-BENSIDE	ALPHA-CHLORDENE	CIS-CHLORDANE
513.52.01	CLEAR LAKE/LOWER LAKE	SED	83-08-17	N	N	N
513.52.15	CLEAR LAKE/SULFUR BANK MINE	SED	83-08-17	N	N	N
513.52.16	CLEAR LAKE/RATTLESNAKE ISLE	SED	83-08-17	N	N	N
513.52.19	CLEAR LAKE/RODMAN SLOUGH	SED	83-08-16	N	N	N

STATION NUMBER	GAMMA CHLOR DENE	TRANS CHLOR DANE	OXY CHLOR DANE	CIS NONA CHLOR	TRANS NONA CHLOR	TOTAL CHLOR DANE	CHLOR PYRIFOS	DAC THAL	OP 'DDD
513.52.01	N	N	N	N	N	N	N	N	N
513.52.15	N	N	N	N	N	N	N	N	N
513.52.16	N	N	N	N	N	N	N	N	N
513.52.19	N	N	N	N	N	N	N	N	N

STATION NUMBER	PP 'DDD	OP 'DDE	PP 'DDE	PP 'DDMU	PP 'DDMS	OP 'DDT	PP 'DDT	TOTAL DDT	DIA ZINON
513.52.01	N	N	N	N	N	N	N	N	N
513.52.15	N	N	N	N	N	N	N	N	N
513.52.16	N	N	N	N	N	N	N	N	N
513.52.19	N	N	N	N	N	N	N	N	N

STATION NUMBER	DIELDRIN	ENDO SULFAN I	ENDO SULFAN II	ENDO SULFAN SULFATE	TOTAL ENDO SULFAN	ENDRIN	ALPHA HCH	BETA HCH	GAMMA HCH
513.52.01	N	N	-1.0	-2.0	D	N	N	N	N
513.52.15	N	N	-1.0	-2.0	D	N	N	N	N
513.52.16	N	N	-1.0	-2.0	D	N	N	N	N
513.52.19	N	N	-1.0	-2.0	D	N	N	N	N

STATION NUMBER	DELTA HCH	HEPTA CHLOR EPOXIDE	HEXA CHLORO BENZENE	PCB 1242	PCB 1248	PCB 1254	TOTAL PCB	PARA THION	TOXA PHENE
513.52.01	N	N	N	N	N	N	N	N	N
513.52.15	N	N	N	N	N	N	N	N	N
513.52.16	N	N	N	N	N	N	N	N	N
513.52.19	N	N	N	N	N	N	N	N	N

N = not analyzed. - = below indicated detection limit. D = below detection limit (no limit indicated).
SED = sediment. COL = adsorbent resin column. H2O = water sample.

1984 ORGANIC CHEMICALS IN FISH (ppb, wet weight)

STATION	STATION NAME	COMMON NAME	TISSUE TYPE	SAMPLE DATE	ALDRIN	ATRAZINE	BENEFIN	CARBARYL	CARBO PHENO THIONIN	CDEC
109.10.10	MAD RIVER	SCULPIN	FLESH	84-08-27	N	N	N	N	N	N
109.10.10	MAD RIVER	SUCKER	FLESH	84-08-27	N	N	N	N	N	N
111.12.01	EEL R / SCOTIA	SCULPIN	FLESH	84-08-28	-5	N	-5	N	-20	-5
519.10.06	SUTTER BYPASS *	CHANNEL CATFISH	FLESH	84-08-02	-5	N	-5	N	-20	-5
520.11.03	COLUSA DRAIN/KNIGHTS LANDING *	CARP	FLESH	84-08-14	-5	N	-5	N	-20	-5
520.11.03	COLUSA DRAIN/KNIGHTS LANDING *	CARP	FLESH	84-08-14	-5	N	-5	N	-20	-5
520.11.03	COLUSA DRAIN/KNIGHTS LANDING *	CHANNEL CATFISH	FLESH	84-08-14	-5	N	-5	N	-20	-5
526.42.02	FALL RIVER	SUCKER	FLESH	84-07-16	-5	N	-5	N	-20	-5
526.42.02	FALL RIVER	SUCKER	FLESH	84-07-16	-5	N	-5	N	-20	-5

STATION	CHLOR BENSIDE	ALPHA CHLORDENE	CIS CHLORDANE	GAMMA CHLORDENE	TRANS CHLORDANE	TOTAL CHLORDANE	CHLORONEB	CHLOR PYRIFOS	DACTHAL	D-D	DDD O,P	DDD P,P	DDE O,P	DDE P,P	DDMS P,P	DDMU P,P	DDT O,P
109.10.10	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
109.10.10	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
111.12.01	-5	-5.0	-5.0	-5	-5.0	0	-75	-10	-5.0	N	-10	-10	-10	-5.0	-30	-15	-10
519.10.06	-5	-5	14.0	-5	8.5	49.8	-75	-10	-5	N	22	140	19	410.0	-30	-15	-10
520.11.03	-5	-5	-5.0	-5	-5.0	0	-75	-10	-5	N	15	62	17	360.0	-30	22	-10
520.11.03	-5	-5	7.0	-5	-5.0	21.0	-75	-10	-5	N	12	85	-10	300.0	-30	18	-10
520.11.03	-5	-5	9.2	-5	5.8	40.9	-75	-10	-5	N	18	140	19	420.0	-30	23	-10
526.42.02	-5	-5	-5.0	-5	-5.0	0	-75	-10	-5	N	-10	-10	-10	8.9	-30	-15	-10
526.42.02	-5	-5	-5.0	-5	-5.0	0	-75	-10	-5	N	-10	-10	-10	8.9	-30	-15	-10

STATION	DDT P,P	TOTAL DDT	DEF	DIAZINON	DICHLO FENTHION	DICOFOL	DIELDRIN	DIPHENAMID	ENDO SULFAN I	ENDO SULFAN II	ENDO SULFAN SULFATE	TOTAL ENDO SULFAN	ENDRIN	ETHION	FENITRO THION
109.10.10	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
109.10.10	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
111.12.01	-10	0	N	-50	-15	-100	-5.0	N	-5	N	N	0	-15	-20	-10
519.10.06	49	640.0	N	-50	-15	190	15.0	N	26.0	-70	-85	26.0	-15	-20	-10
520.11.03	-10	476.0	N	-50	-15	-100	5.4	N	7.7	-70	-85	7.7	-15	-20	-10
520.11.03	-10	415.0	N	-50	-15	-100	7.7	N	7.8	-70	-85	7.8	-15	-20	-10
520.11.03	32	652.0	N	-50	-15	-100	-5.0	N	14.0	-70	-85	14.0	-15	-20	-10
526.42.02	-10	8.9	N	-50	-15	-100	-5.0	N	-5.0	N	N	0	-15	-20	-10
526.42.02	-10	8.9	N	-50	-15	-100	-5.0	N	-5.0	N	N	0	-15	-20	-10

STATION	FENTHION	FONOFOS	GUTHION	HCH ALPHA	HCH BETA	HCH DELTA	HCH GAMMA	HEPTACHLOR	HEPTA CHLOR EPOXIDE	HEXA CHLORO BENZENE	MALATHION	METHI DATHION	METH OXYCHLOR	MIREX	MOLINATE
109.10.10	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
109.10.10	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
111.12.01	N	-5	N	-2.0	-10	-5	-2.0	-5	-5	-2.0	N	N	-15	-10	N
519.10.06	N	-5	N	-2.0	-10	-5	-2.0	-5	-5	-2.0	N	N	-15	-10	N
520.11.03	N	-5	N	-2.0	-10	-5	-2	-5	-5	-2.0	N	N	-15	-10	N
520.11.03	N	-5	N	-2.0	-10	-5	-2	-5	-5	-2.0	N	N	-15	-10	N
520.11.03	N	-5	N	-2.0	-10	-5	-2	-5	-5	-2.0	N	N	-15	-10	N
526.42.02	N	-5	N	-2.0	-10	-5	-2	-5	-5	-2.0	N	N	-15	-10	N
526.42.02	N	-5	N	-2.0	-10	-5	-2	-5	-5	-2.0	N	N	-15	-10	N

STATION	NITROFEN	CIS NONACHLOR	TRANS NONACHLOR	OMITE	ORGANO ARSENICALS	OXYCHLORDANE	PARATHION ETHYL	PARATHION METHYL	PCB 1242	PCB 1248	PCB 1254	PCB 1260	TOTAL PCB	PCNB
109.10.10	N	N	N	N	N	N	N	N	N	N	N	N	N	N
109.10.10	N	N	N	N	N	N	N	N	N	N	N	N	N	N
111.12.01	-10	-5	-5.0	N	N	-5	-10	-10	-50	-50	-50	-50	0	-5
519.10.06	-10	7.3	20.0	N	N	-5.0	-10	-10	-50	-50	93	-50	93	-5
520.11.03	-10	-5.0	-5.0	N	N	-5.0	-10	-10	-50	-50	-50	-50	0	-5
520.11.03	-10	-5.0	14.0	N	N	-5.0	-10	-10	-50	-50	80	54	134	-5
520.11.03	-10	5.9	20.0	N	N	-5.0	-10	-10	-50	-50	120	72	192	-5
526.42.02	-10	-5.0	-5.0	N	N	-5.0	-10	-10	-50	-50	-50	-50	0	-5
526.42.02	-10	-5.0	-5.0	N	N	-5.0	-10	-10	-50	-50	-50	-50	0	-5

N = not analyzed. - = below indicated detection limit. 0 = below detection limit (no limit indicated).

* NOT WITHIN NORTHERN DISTRICT BUT WITHIN THE MONITORING AREA

1984 (continued)

STATION	PENTA CHLOROPHENOL	PERTHANE	PHENKAPTON	PHORATE	PRONAMIDE	RONNEL	SIMAZINE	STROBANE	TCE	TETRADIFON	TOXAPHENE	# PEAKS>5PPB @ 0% ETHYL ETHER
109.10.10	2.6	N	N	N	N	N	N	N	N	N	N	N
109.10.10	7.2	N	N	N	N	N	N	N	N	N	N	N
111.12.01	N	-150	-15	-60	N	-5	N	-200	N	-10	-100	N
519.10.06*	N	-150	-15	-60	N	-5	N	-200	N	-10	450	N
*520.11.03**	*N*	*-150*	*-15*	*-60*	*N*	*-5*	*N*	*-200*	*N*	*-10*	*-100*	*N*
520.11.03*	N	-150	-15	-60	N	-5	N	-200	N	-10	-100	N
520.11.03*	N	-150	-15	-60	N	-5	N	-200	N	-10	450	N
526.42.02	N	-150	-15	-60	N	-5	N	-200	N	-10	-100	N
526.42.02	N	-150	-15	-60	N	-5	N	-200	N	-10	-100	N

STATION	# PEAKS >5PPB @ 6% ETHYL ETHER	# PEAKS >5PPB @ 15% ETHYL ETHER	2,4-D ACID	2,4-D ISOBUTYL ESTER	2,4-D N-BUTYL ESTER	2,4-D ISOPROPYL ESTER	TETRA CHLORO PHENOL	DICHLORO BENZO PHENONE P,P
109.10.10	N	N	N	N	N	N	1.7	N
109.10.10	N	N	N	N	N	N	2.6	N
111.12.01	N	N	N	-100	-100	-100	N	N
519.10.06	N	N	N	-100	-100	-100	N	37
520.11.03	N	N	N	-100	-100	-100	N	N
520.11.03	N	N	N	-100	-100	-100	N	N
520.11.03	N	N	N	-100	-100	-100	N	N
526.42.02	N	N	N	-100	-100	-100	N	N
526.42.02	N	N	N	-100	-100	-100	N	N

N = not analyzed. - = below indicated detection limit. D = below detection limit (no limit indicated).

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1984 ORGANIC CHEMICALS IN SOIL, SEDIMENT OR WATER SAMPLES (ppb, wet weight)

STATION NUMBER	STATION NAME			TYPE	SAMPLE DATE		CHLOR BEN SIDE	ALPHA CHLOR DENE	CIS CHLOR DANE
520.11.03	COLUSA DRAIN/KNIGHTS LANDING *			SED	84-11-20		<0.5	<0.5	<0.5
STATION NUMBER	GAMMA CHLOR DENE	TRANS CHLOR DANE	OXY CHLOR DANE	CIS NONA CHLOR	TRANS NONA CHLOR	TOTAL CHLOR DANE	CHLOR PYRIFOS	DAC THAL	OP 'DDD
520.11.03	<0.5	<0.5	<0.5	<0.5	<0.5	D	<10	<0.2	<1
STATION NUMBER	PP 'DDD	OP 'DDE	PP 'DDE	PP 'DDMU	PP 'DDHS	OP 'DDT	PP 'DDT	TOTAL DDT	DIAZINON
520.11.03	2	<1	2.6	<2.	<3	<1	<1	4.6	<5
STATION NUMBER	DIELDRIN	ENDO SULFAN I	ENDO SULFAN II	ENDO SULFAN SULFATE	TOTAL ENDO SULFAN	ENDRIN	ALPHA HCH	BETA HCH	GAMMA HCH
520.11.03	<0.5	<0.5	N	N	D	<15	<0.2	<1	<0.2
STATION NUMBER	DELTA HCH	HEPTA CHLOR EPOXIDE	HEXA CHLORO BENZENE	PCB 1242	PCB 1248	PCB 1254	TOTAL PCB	PARA THION	TOXA PHENE
520.11.03	<0.5	<0.5	<0.2	<5	<5	<5	D	<1	<10

N = not analyzed. < = below indicated detection limit. D = below detection limit (no limit indicated).
SED = sediment. COL = adsorbent resin column. H2O = water sample.

* NOT WITHIN NORTHERN DISTRICT BUT WITHIN THE MONITORING AREA

TOXIC SUBSTANCES MONITORING PROGRAM
SUMMARY OF 1985 DATA: ORGANIC CHEMICALS IN FISH (ppb, wet weight)

STATION	STATION NAME	COMMON NAME	TISSUE TYPE	SAMPLE DATE	Aldrin	alpha-Chlordane	cis-Chlordane	gamma-Chlordane	trans-Chlordane	cis-Nonachlor	trans-Nonachlor	Oxychlordane	Total Chlordane
109.10.10	MAD RIVER	SCULPIN	F	08/29/85	NA	NA	NA	NA	NA	NA	NA	NA	NA
109.10.10	MAD RIVER	SUCKER	F	08/29/85	NA	NA	NA	NA	NA	NA	NA	NA	NA
520.11.03	COLUSA DRAIN/KNIGHTS LANDING *	CHANNEL CATFISH	F	09/06/85	15.	< 5.	< 5.0	< 5.0	< 5.0	< 5.0	5.7	< 5.0	5.7
520.11.03	COLUSA DRAIN/KNIGHTS LANDING *	WHITE CATFISH	F	09/06/85	< 5.	< 5.	< 5.0	< 5.0	< 5.0	< 5.0	8.6	< 5.0	8.6

STATION	Chlorpyrifos	Diazinon	Dicofol (Kelthane)	Dichlorobenzophenone	Dieldrin	Endosulfan I	Endosulfan II	Endosulfan Sulfate	Total Endosulfan
109.10.10	NA	NA	NA	NA	NA	NA	NA	NA	NA
109.10.10	NA	NA	NA	NA	NA	NA	NA	NA	NA
520.11.03	< 10.	< 10.	< 100.	NA	25.0	8.0	< 70.0	< 85.0	8.0
520.11.03	< 10.	< 10.	< 100.	NA	6.4	< 5.0	< 70.0	< 85.0	ND

STATION	Endrin	alpha-HCH	beta-HCH	delta-HCH	gamma-HCH (Lindane)	Heptachlor Epoxide	Hexachlorobenzene	Ethyl Parathion	PCB 1248	PCB 1254	PCB 1260	Total PCB	Pentachlorophenol	Tetrachlorophenol	Toxaphene	Chem Group A
109.10.10	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 2.0	< 2.0	NA	NA
109.10.10	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	3.4	< 2.0	NA	NA
520.11.03	< 15.0	< 2.0	< 10.	< 5.0	< 2.0	< 5.0	< 2.0	< 10.	< 50.	< 50.	< 50.	ND	NA	NA	< 100.0	53.7
520.11.03	< 15.0	< 2.0	< 10.	< 5.0	< 2.0	< 5.0	< 2.0	< 10.	< 50.	< 50.	< 50.	ND	NA	NA	< 100.0	15.0

TOXIC SUBSTANCES MONITORING PROGRAM
SUMMARY OF 1985 DATA: ORGANIC CHEMICALS IN FISH (ppb, lipid weight)

STATION	STATION NAME	COMMON NAME	TISSUE TYPE	SAMPLE DATE	Aldrin	alpha-Chlordane	cis-Chlordane	gamma-Chlordane	trans-Chlordane	cis-Nonachlor	trans-Nonachlor	Oxychlordane
109.10.10	MAD RIVER	SCULPIN	F	08/29/85	NA	NA	NA	NA	NA	NA	NA	NA
109.10.10	MAD RIVER	SUCKER	F	08/29/85	NA	NA	NA	NA	NA	NA	NA	NA
520.11.03	COLUSA DRAIN/KNIGHTS LANDING *	CHANNEL CATFISH	F	09/06/85	540.6	ND	ND	ND	ND	ND	205.4	ND
520.11.03	COLUSA DRAIN/KNIGHTS LANDING *	WHITE CATFISH	F	09/06/85	ND	ND	ND	ND	ND	ND	633.2	ND

STATION	Total Chlordane	Chlorpyrifos	Diazinon	o,p' DDD	p,p' DDD	o,p' DDE	p,p' DDE	o,p' DDT	p,p' DDT	p,p' DDMU	p,p' DDMS	Total DDT	Dieldrin	Endosulfan I	Endosulfan II	Endosulfan Sulfate
109.10.10	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
109.10.10	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
520.11.03	205.4	ND	ND	ND	2702.8	ND	15495.9	ND	ND	ND	ND	18198.7	900.9	284.3	ND	ND
520.11.03	633.2	ND	ND	ND	4785.7	ND	61110.3	ND	ND	ND	ND	65896.0	471.2	ND	ND	ND

STATION	Total Endosulfan	Endrin	alpha-HCH	gamma-HCH (Lindane)	Heptachlor Epoxide	Hexachlorobenzene	Ethyl Parathion	PCB 1248	PCB 1254	PCB 1260	Total PCB	Pentachlorophenol	Toxaphene	Chem Group A
109.10.10	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	NA	NA
109.10.10	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	119.8	NA	NA
520.11.03	284.3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	1935.2
520.11.03	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	1104.4

NA means that the sample was not analyzed for the chemical.
ND means that the chemical was not detected (detection limit not determined).
< means that the chemical was not detected above the indicated limit of detection.

F = Fillet
W = Whole Body

Chemical Group A includes the sum of aldrin, dieldrin, endrin, heptachlor, heptachlor epoxide, chlordane, hexachlorocyclohexane, endosulfan, and toxaphene.

* NOT WITHIN NORTHERN DISTRICT BUT WITHIN THE MONITORING AREA

Toxic Substances Monitoring Program
Summary of 1986 Data: Organic Chemicals in Fish (ppb, wet weight)

STATION NUMBER	STATION NAME	COMMON NAME	TISSUE TYPE	SAMPLE DATE	Aldrin	alpha-Chlordane	cis-Chlordane	gamma-Chlordane	trans-Chlordane	cis-Nonachlor	trans-Nonachlor	Oxychlordane	Total Chlordane
105.50.36	BRANNAN CREEK	BROWN TROUT	F	07/11/86	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	ND
511.40.00	SACRAMENTO SLOUGH *	CARP	F	07/24/86	<5.0	<5.0	9.7	<5.0	<5.0	<5.0	9.2	<5.0	18.9
637.20.01	SUSAN R/HONEY LAKE	LARGEMOUTH BASS	F	10/08/86	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	ND

STATION NUMBER	Chlorpyrifos	Diazinon	o,p' DDD	p,p' DDD	o,p' DDE	p,p' DDE	o,p' DDT	p,p' DDT	p,p' DDMU	p,p' DDMS	Total DDT	Dieldrin	Dicofol (Kelthane)	Dichlorobenzophenone	Dieldrin	Endosulfan I	Endosulfan II	Endosulfan Sulfate	Total Endosulfan
105.50.36	<10.0	<5.0	<10.0	<10.0	<10.0	<5.0	<10.0	<10.0	<15.0	<30.0	ND	<50.0	<100.0	NA	<5.0	<5.0	NA	NA	ND
511.40.00	<10.0	<5.0	<10.0	50.0	<10.0	360.0	<10.0	<10.0	<15.0	<30.0	410.0	450.0	<100.0	NA	<5.0	<5.0	NA	NA	ND
637.20.01	<10.0	<5.0	<10.0	<10.0	<10.0	<5.0	<10.0	<10.0	<15.0	<30.0	ND	NA	<100.0	NA	NA	<5.0	NA	NA	ND

STATION NUMBER	Endrin	alpha-HCH	beta-HCH	delta-HCH	gamma-HCH (Lindane)	Total HCH	Heptachlor	Heptachlor Epoxide	Hexachlorobenzene	Ethyl Parathion	PCB 1248	PCB 1254	PCB 1260	Total PCB	Toxaphene	Chemical Group A
105.50.36	<15.0	<2.0	<10.0	<5.0	<2.0	ND	<5.0	<5.0	<2.0	<10.0	<50.0	<50.0	<50.0	ND	<100.0	ND
511.40.00	<15.0	<2.0	<10.0	<5.0	<2.0	ND	<5.0	<5.0	<2.0	<10.0	<50.0	59.0	<50.0	59.0	<100.0	18.9
637.20.01	<15.0	<2.0	<10.0	<5.0	<2.0	ND	<5.0	<5.0	<2.0	NA	<50.0	<50.0	<50.0	ND	<100.0	ND

NA Means that the sample was not analyzed for the chemical.
ND Means that the chemical was not detected (detection limit not determined).
< Means that the chemical was not detected above the indicated limit of detection.

F = Fillet
W = Whole Body

Toxic Substances Monitoring Program
Summary of 1986 Data: Organic Chemicals in Fish (ppb, lipid weight)

STATION NUMBER	STATION NAME	COMMON NAME	TISSUE TYPE	SAMPLE DATE	alpha-Chlordane	cis-Chlordane	gamma-Chlordane	trans-Chlordane	cis-Nonachlor	trans-Nonachlor	Oxychlordane	Total Chlordane
105.50.36	BRANNAN CREEK	BROWN TROUT	F	07/11/86	ND	ND	ND	ND	ND	ND	ND	ND
511.40.00	SACRAMENTO SLOUGH *	CARP	F	07/24/86	ND	196.8	ND	ND	ND	186.8	ND	383.6
637.20.01	SUSAN R/HONEY LAKE	LARGEMOUTH BASS	F	10/08/86	ND	ND	ND	ND	ND	ND	ND	ND

STATION NUMBER	Chlorpyrifos	Diazinon	o,p' DDD	p,p' DDD	o,p' DDE	p,p' DDE	o,p' DDT	p,p' DDT	p,p' DDMU	Total DDT	Dicofol (Kelthane)	Dichlorobenzophenone	Dieldrin	Endosulfan I	Endosulfan II
105.50.36	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	ND	NA
511.40.00	ND	ND	ND	1016.2	ND	7302.2	ND	ND	ND	8316.4	ND	NA	ND	ND	NA
637.20.01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA	ND	NA

STATION NUMBER	Endosulfan Sulfate	Total Endosulfan	Endrin	alpha-HCH	gamma-HCH (Lindane)	Total HCH	Heptachlor Epoxide	Hexachlorobenzene	Ethyl Parathion	PCB 1254	PCB 1260	Total PCB	Toxaphene	Chemical Group A
105.50.36	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
511.40.00	NA	ND	ND	ND	ND	ND	ND	ND	ND	1196.8	ND	1196.8	ND	383.6
637.20.01	NA	ND	ND	ND	ND	ND	ND	ND	NA	ND	ND	ND	ND	ND

NA Means that the sample was not analyzed for the chemical.
ND Means that the chemical was not detected (detection limit not determined).

F = Fillet
W = Whole Body

Chemical Group A includes the sum of aldrin, dieldrin, endrin, heptachlor, heptachlor epoxide, chlordane, hexachlorocyclohexane, endosulfan, and toxaphene.

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Toxic Substances Monitoring Program
Summary of 1987 Data: Organic Chemicals in Fish (ppb, wet weight)

STATION NUMBER	STATION NAME	SPECIES CODE	TISSUE TYPE	SAMPLE DATE	Aldrin	alpha-Chlordane	cis-Chlordane	gamma-Chlordane	trans-Chlordane	cis-Nonachlor	trans-Nonachlor	Oxychlordane	Total Chlordane	Chlorpyrifos	Dacthal	Dieldrin
105.13.05	[illegible] R/SFS MUNI BASIN	RBT	F	05/18/87	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
111.12.01	EEL R/SCOTIA	SCP	F	09/10/87	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
111.21.01	VAN DUZEN R/MOUTH	RBT	F	09/11/87	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
111.21.02	YAGER CR/MOUTH	RBT	F	09/11/87	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
115.92.01	LOST R/SIXTE LAKE	RCH	W	10/20/87	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	ND	<10.0	<5.0	<5.0
115.92.01	LOST R/SIXTE LAKE	SP	W	10/20/87	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	ND	<10.0	<5.0	<5.0
508.10.42	SACRAMENTO R/KESWICK	RBT	F	10/08/87	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	ND	<10.0	5.9	<5.0
508.10.42	SACRAMENTO R/KESWICK	SKR	F	10/08/87	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	ND	<10.0	<5.0	<5.0
519.22.01	SACRAMENTO STURGEON *	LHB	F	08/21/87	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	ND	<10.0	<5.0	<5.0
519.22.50	FEATHER R/D/S HWY 99 BRG *	SHB	F	08/25/87	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	ND	<10.0	<5.0	<5.0
520.21.50	COLUSA DRAIN/WEIRS LANDING *	ECF	F	09/25/87	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	ND	<10.0	<5.0	<5.0
526.63.10	PIT R/D/S HWY 299 BRG	CCF	F	10/20/87	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	ND	<10.0	<5.0	<5.0
526.63.10	PIT R/D/S HWY 299 BRG	SKR	F	10/20/87	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	ND	<10.0	<5.0	<5.0

STATION NUMBER	o,p' DDD	p,p' DDD	o,p' DDE	p,p' DDE	o,p' DDT	p,p' DDT	p,p' DDMU	p,p' DDMS	Total DDT	Bifenthrin	BHC	Blazinon	Endosulfan I	Endosulfan II	Endosulfan Sulfate	Total Endosulfan	Endrin
105.13.05	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
111.12.01	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
111.21.01	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
111.21.02	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
115.92.01	<10.0	<10.0	<10.0	6.6	<10.0	<10.0	<15.0	<30.0	6.6	<100.0	NA	<50.0	<5.0	NA	NA	ND	<15.0
115.92.01	<10.0	<10.0	<10.0	<5.0	<10.0	<10.0	<15.0	<30.0	ND	<100.0	NA	<50.0	<5.0	NA	NA	ND	<15.0
508.10.42	<10.0	<10.0	<10.0	9.9	<10.0	<10.0	<15.0	<30.0	9.9	<100.0	NA	<50.0	<5.0	<70.0	<85.0	ND	<15.0
508.10.42	<10.0	<10.0	<10.0	33.0	<10.0	<10.0	<15.0	<30.0	33.0	<100.0	NA	<50.0	<5.0	<70.0	<85.0	ND	<15.0
519.22.01	<10.0	<10.0	<10.0	53.0	<10.0	<10.0	<15.0	<30.0	53.0	<100.0	NA	<50.0	<5.0	NA	NA	ND	<15.0
519.22.50	<10.0	<10.0	<10.0	14.0	<10.0	<10.0	<15.0	<30.0	14.0	<100.0	NA	<50.0	<5.0	NA	NA	ND	<15.0
520.21.50	<10.0	57.0	<10.0	190.0	<10.0	<10.0	<15.0	<30.0	247.0	<100.0	NA	<50.0	<5.0	<70.0	<85.0	ND	<15.0
526.63.10	<10.0	<10.0	<10.0	<5.0	<10.0	<10.0	<15.0	<30.0	ND	<100.0	NA	<50.0	<5.0	NA	NA	ND	<15.0
526.63.10	<10.0	<10.0	<10.0	<5.0	<10.0	<10.0	<15.0	<30.0	ND	<100.0	NA	<50.0	<5.0	NA	NA	ND	<15.0

STATION NUMBER	Alpha-HCH	Beta-HCH	Delta-HCH	Gamma-HCH (Lindane)	Total HCH	Heptachlor	Hepta-chlor-epoxide	Hexa-chloro-benzene	Methoxy-chlor	Ethyl-para-thion	PCB 1248	PCB 1254	PCB 1260	Total PCB	Toxaphene	Chemical Group A
105.13.05	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
111.12.01	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
111.21.01	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
111.21.02	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
115.92.01	<2.0	<10.0	<5.0	<2.0	ND	<5.0	<5.0	<2.0	<15.0	<10.0	<30.0	<30.0	<30.0	ND	<100.0	ND
115.92.01	<2.0	<10.0	<5.0	<2.0	ND	<5.0	<5.0	<2.0	<15.0	<10.0	<30.0	<30.0	<30.0	ND	<100.0	ND
508.10.42	<2.0	<10.0	<5.0	<2.0	ND	<5.0	<5.0	<2.0	<15.0	<10.0	<50.0	<50.0	<50.0	ND	<100.0	ND
508.10.42	<2.0	<10.0	<5.0	<2.0	ND	<5.0	<5.0	<2.0	<15.0	<10.0	<50.0	<50.0	<50.0	ND	<100.0	ND
519.22.01	<2.0	<10.0	<5.0	<2.0	ND	<5.0	<5.0	<2.0	<15.0	<10.0	<50.0	<50.0	52.0	52.0	<100.0	ND
519.22.50	<2.0	<10.0	<5.0	<2.0	ND	<5.0	<5.0	<2.0	<15.0	<10.0	<50.0	<50.0	<50.0	ND	<100.0	ND
520.21.50	<2.0	<10.0	<5.0	<2.0	ND	<5.0	<5.0	<2.0	<15.0	<10.0	<50.0	<50.0	<50.0	ND	<100.0	ND
526.63.10	<2.0	<10.0	<5.0	<2.0	ND	<5.0	<5.0	<2.0	<15.0	<10.0	<50.0	<50.0	<50.0	ND	<100.0	ND
526.63.10	<2.0	<10.0	<5.0	<2.0	ND	<5.0	<5.0	<2.0	<15.0	<10.0	<50.0	<50.0	<50.0	ND	<100.0	ND

Summary of 1987 Data: Organic Chemicals in Fish (ppb, lipid weight)

STATION NUMBER	STATION NAME	SPECIES CODE	TISSUE TYPE	SAMPLE DATE	Aldrin	alpha-Chlordane	cis-Chlordane	gamma-Chlordane	trans-Chlordane	cis-Nonachlor	trans-Nonachlor	Oxychlordane	Total Chlordane
105.13.05	[illegible] R/SFS MUNI BASIN	RBT	F	05/18/87	NA	NA	NA	NA	NA	NA	NA	NA	NA
111.12.01	EEL R/SCOTIA	SCP	F	09/10/87	NA	NA	NA	NA	NA	NA	NA	NA	NA
111.21.01	VAN DUZEN R/MOUTH	RBT	F	09/11/87	NA	NA	NA	NA	NA	NA	NA	NA	NA
111.21.02	YAGER CR/MOUTH	RBT	F	09/11/87	NA	NA	NA	NA	NA	NA	NA	NA	NA
115.92.01	LOST R/SIXTE LAKE	RCH	W	10/20/87	ND	ND	ND	ND	ND	ND	ND	ND	ND
115.92.01	LOST R/SIXTE LAKE	SP	W	10/20/87	ND	ND	ND	ND	ND	ND	ND	ND	ND
508.10.42	SACRAMENTO R/KESWICK	RBT	F	10/08/87	ND	ND	ND	ND	ND	ND	ND	ND	ND
508.10.42	SACRAMENTO R/KESWICK	SKR	F	10/08/87	ND	ND	ND	ND	ND	ND	ND	ND	ND
519.22.01	SACRAMENTO STURGEON *	LHB	F	08/21/87	ND	ND	ND	ND	ND	ND	ND	ND	ND
519.22.50	FEATHER R/D/S HWY 99 BRG *	SHB	F	08/25/87	ND	ND	ND	ND	ND	ND	ND	ND	ND
520.21.50	COLUSA DRAIN/WEIRS LANDING *	ECF	F	09/25/87	ND	ND	ND	ND	ND	ND	ND	ND	ND
526.63.10	PIT R/D/S HWY 299 BRG	CCF	F	10/20/87	ND	ND	ND	ND	ND	ND	ND	ND	ND
526.63.10	PIT R/D/S HWY 299 BRG	SKR	F	10/20/87	ND	ND	ND	ND	ND	ND	ND	ND	ND

STATION NUMBER	Chlorpyrifos	Dacthal	o,p' DDD	p,p' DDD	o,p' DDE	p,p' DDE	o,p' DDT	p,p' DDT	p,p' DDMU	Total DDT	Bifenthrin	Endosulfan I	Endosulfan II	Endosulfate Sulfate	Total Endosulfan
105.13.05	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
111.12.01	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
111.21.01	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
111.21.02	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
115.92.01	ND	ND	ND	ND	ND	266.3	ND	ND	ND	266.3	ND	ND	NA	NA	ND
115.92.01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA	ND
508.10.42	ND	93.2	ND	ND	ND	156.4	ND	ND	ND	156.4	ND	ND	ND	ND	ND
508.10.42	ND	ND	ND	ND	ND	502.3	ND	ND	ND	502.3	ND	ND	ND	ND	ND
519.22.01	ND	ND	ND	ND	ND	23043.5	ND	ND	ND	23043.5	ND	ND	NA	NA	ND
519.22.50	ND	ND	ND	ND	ND	5386.6	ND	ND	ND	5386.6	ND	ND	NA	NA	ND
520.21.50	ND	ND	ND	5588.2	ND	18627.4	ND	ND	ND	24215.6	ND	ND	ND	ND	ND
526.63.10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA	ND
526.63.10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA	ND

STATION NUMBER	Endrin	Alpha-HCH	Beta-HCH	Delta-HCH	Gamma-HCH (Lindane)	Total HCH	Hepta-chlor	Hepta-chlor-epoxide	Hexa-chloro-benzene	Methoxy-chlor	Penta-chloro-phenol	PCB 1254	PCB 1260	Total PCB	Toxaphene	Chemical Group A
105.13.05	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	316.5	NA	NA	NA	NA	NA
111.12.01	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA
111.21.01	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA
111.21.02	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA
115.92.01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
115.92.01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	ND	ND	ND	ND
508.10.42	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	ND	ND	ND	ND
508.10.42	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	791.5	791.5	ND	ND
519.22.01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	ND	ND	ND	ND
519.22.50	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	ND	ND	ND	ND
520.21.50	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	ND	ND	ND	ND
526.63.10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	ND	ND	ND	ND
526.63.10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	ND	ND	ND	ND

NA Means that the sample was not analyzed for the chemical.
ND Means that the chemical was not detected.
< Means that the chemical was not detected above the indicated limit of detection.

F = Fillet
W = Whole Body

Chemical Group A includes the sum of aldrin, dieldrin, endrin, heptachlor, heptachlor epoxide, chlordane, hexachlorocyclohexane, endosulfan, and toxaphene

* [illegible] MONITORING DISTRICT BUT WITHIN THE MONITORING AREA

Species Analyzed During the 1987 Toxic Substances Monitoring Program
Listed by Code
WITHIN NORTHERN DISTRICT AND THE MONITORING AREA

Code	Common Name	Species	Family
CCF	Channel Catfish	*Ictalurus punctatus*	Ictaluridae
GSF	Green Sunfish	*Lepomis cyanellus*	Centrarchidae
LMB	Largemouth Bass	*Micropterus salmoides*	Centrarchidae
RBT	Rainbow Trout	*Salmo gairdneri*	Salmonidae
RCH	California Roach	*Hesperoleucus symmetricus*	Cyprinidae
SCP	Sculpin	*Cottus* sp.	Cottidae
SKR	Sucker	*Catostomus* sp.	Catostomidae
SMB	Smallmouth Bass	*Micropterus dolomieui*	Centrarchidae
SP	Sacramento Perch	*Archoplites interruptus*	Centrarchidae

1987 Toxic Substances Monitoring Program
Station Number Changes

New Station Number	Old Station Number	Station Name
109.10.06	109.10.10	Mad River
504.20.03	523.12.10	Sacramento River/Hamilton city
506.10.00	526.22.00	Mccloud River/McCloud River Bridge
506.10.03	525.11.01	Shasta Lake/Squaw Creek Arm
508.10.42	524.47.15	Sacramento River/Keswick
519.22.01	511.40.00	* Sacramento Slough
519.22.90	511.40.04	* Feather River/D/S Highway 99 Bridge
520.10.03	519.10.07	* Reclamation Slough
520.10.04	519.10.06	* Sutter Bypass
520.21.90	520.11.03	* Colusa Drain/Knights Landing
520.21.91	520.11.36	Colusa Drain/Abel Road
526.41.06	526.42.02	Fall River

Toxic Substances Monitoring Program
Station Name Changes

Station Number	New Station Name	Old Station Name
506.10.00	McCloud River/D/S McCloud River Bridge	McCloud River
519.22.90	Feather River/D/S Highway 99 Bridge	Feather River/Nicholas
526.63.10	Pit River/D/S Hwy 299 Bridge	Pit River/D/S Modoc Nwr
637.20.22	Susan River/Litchfield	Susan River

* NOT WITHIN NORTHERN DISTRICT BUT WITHIN THE MONITORING AREA